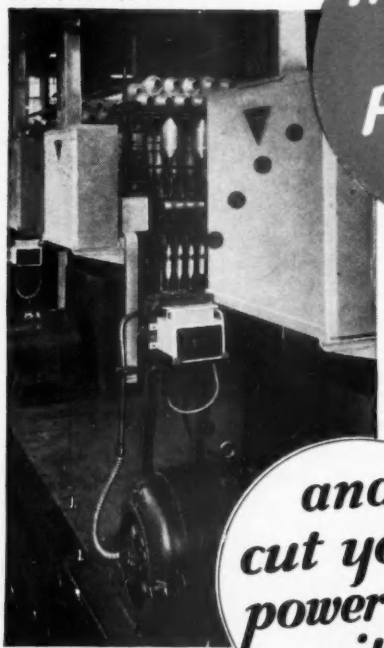
ELECTRICAL TIMES

THURSDAY
8 JAN.
1953
NINEPENCE

1·5 kVAr Capacitors installed at Messrs. A. S. Orr & Co. Ltd. mill, Bamber Bridge, Nr. Preston. Contractors: Stewart Porter, Chorley, Lancs.



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BICC Power Capacitors connected to your motors will automatically improve the power factor and so reduce losses to a minimum. When tariffs include a power factor clause, BICC Capacitors make a direct and valuable saving on your power bill—and usually pay for themselves within a short period.

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and cut your power costs with

B.I. Callender's POWER CAPACITORS

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REALLY IS

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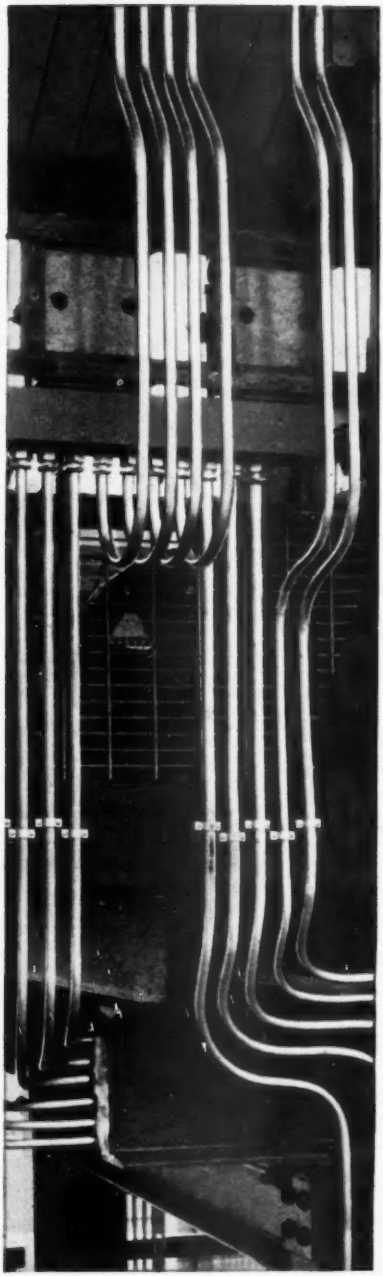

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in 1883

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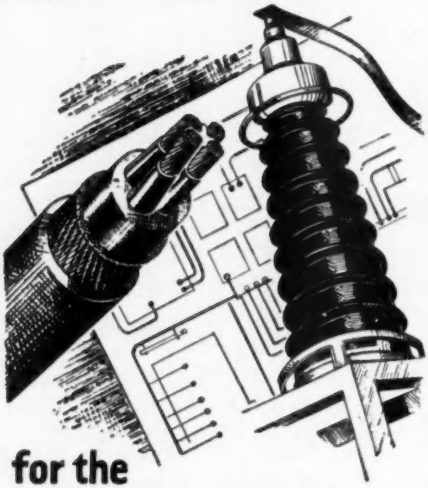

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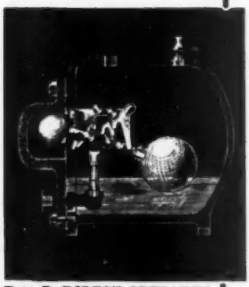

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But do you know how well it cooks, and how much it cooks? Just look at this for a meal—

Soup	*Roast Potatoes*
2 lb. Joint of Roast Beef	*Cauliflower, Carrots*
Yorkshire Pudding	*Fruit Pie & Custard*

—all cooked easily and quickly on this marvellous little cooker for less than 2d. (at 1d. per unit). It's just the thing for the small home, with only one or two people (and there are 5½ million such homes in this country, according to the 1951 Census figures).
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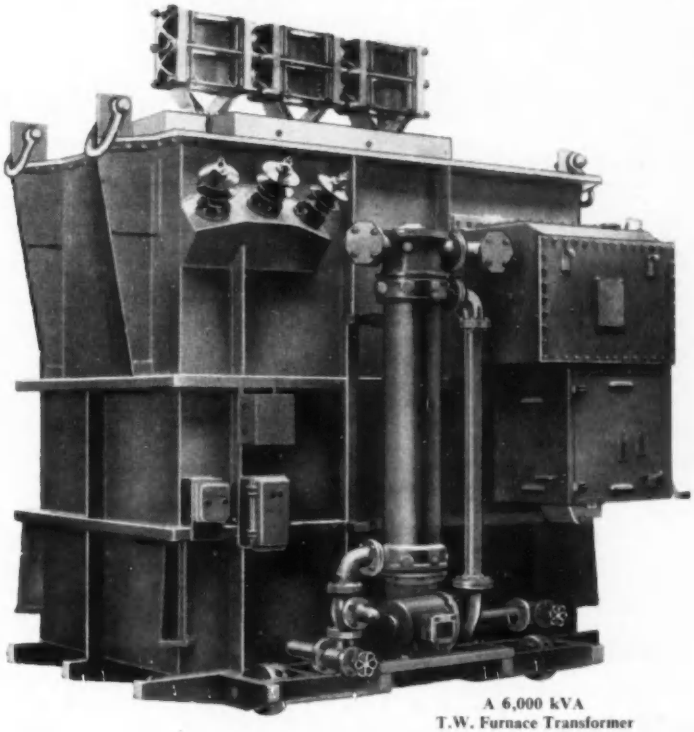

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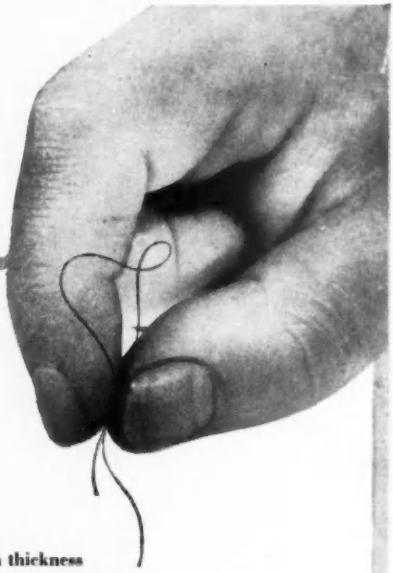

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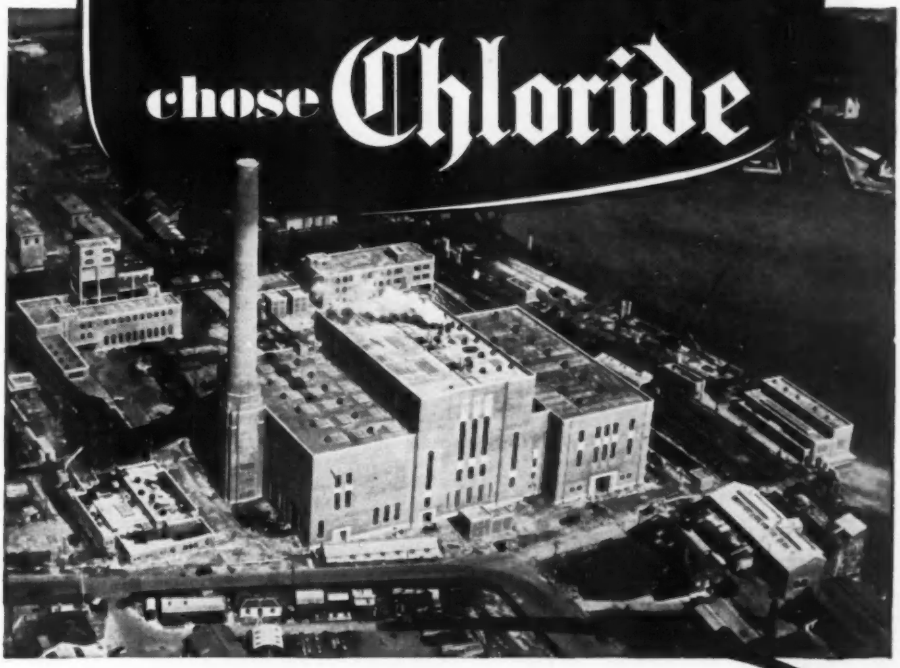
PLYMOUTH 'B' chose Chloride



5,68

THREE Chloride storage batteries supply the power for switchgear operation, emergency lighting and other essential services in the new Plymouth 'B' power station now operating for the British Electricity Authority, South Western Division. The two larger batteries, each of 120 Chloride DLG8 cells, capacity 200 Ah at the 10-hour rate, are used for both emergency lighting and switchgear operation. The third, of 24 cells with the same capacity, supplies the telecommunications circuits and is also used for supervisory control and similar services.

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This Cheese Core Sleeve (for textile winding) requires grooving on the outside and an undercut recess half-way down the bore, yet must be completely free of flash or burrs. A transfer injection moulding held to close limits of tolerance solved both these problems.

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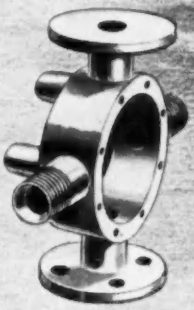

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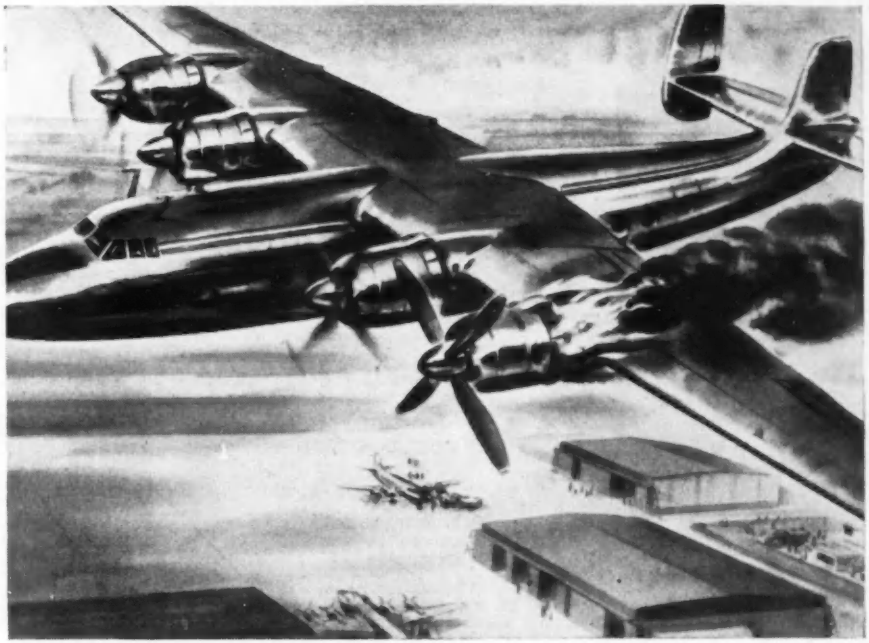

Once this would have meant almost certain disaster . . . Today it probably means no more than an extra job for the ground staff—for modern multi-engined aircraft will fly with one or more engines shut-down . . . provided the controls to the remaining engines are intact. This is one reason why most aircraft use 'Fibreglass' insulated Pren* cables which stand up to direct exposure to flame. Other reasons — which apply to all 'Fibreglass' electrical insulation — are less weight, less space, greater heat resistance, higher safe working-temperatures, freedom from alkali with consequent resistance to moisture. All of which mean longer life and greater reliability.

*'Pren' cables incorporate one or more layers of braided glass fibre and are finished with a fire-retarding lacquer.

wrap it in* FIBREGLASS *for safety

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Also available in 150 and 200 watt sizes.

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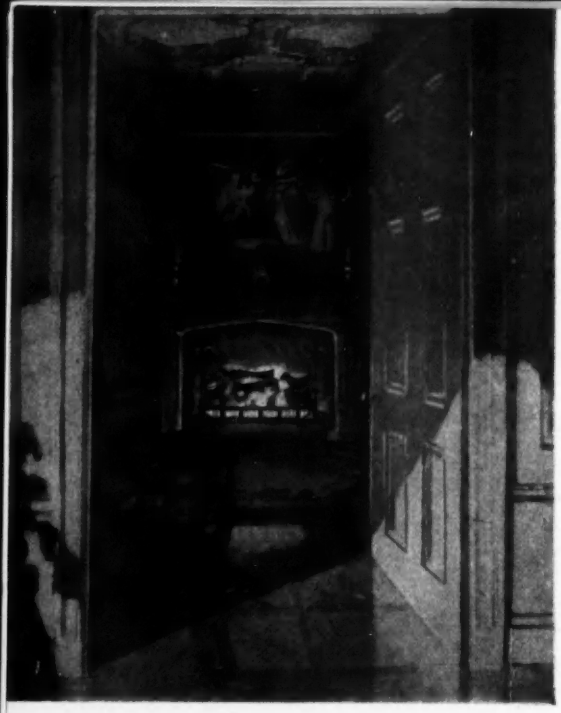

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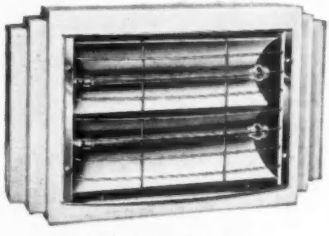

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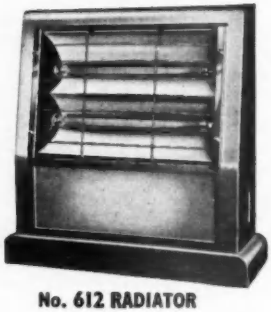

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It is now generally admitted that the heating needs of Britain cannot be met by a rigid fuel policy which ignores the heating habits of the people. The individual nature of our homes, our tastes and our weather makes *elasticity* a supreme virtue. In this respect there is no rival to the electric fire, which can be moved from room to room and switched on just when it is needed, *for as long as it is needed and no longer.*

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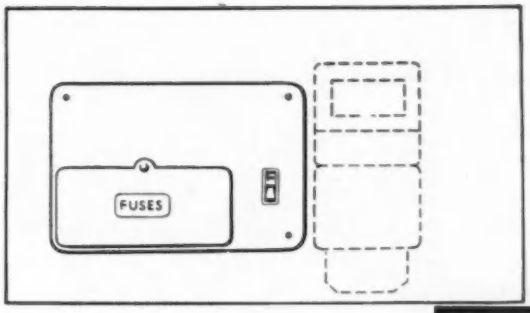

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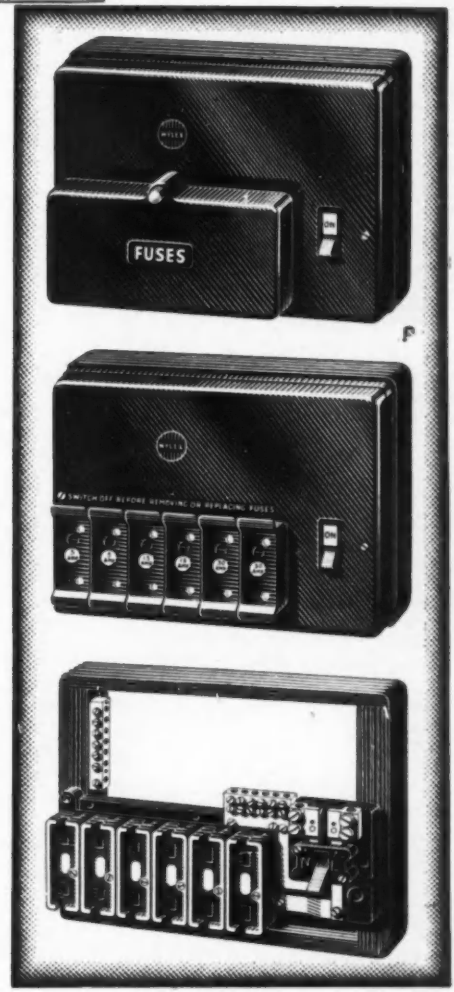
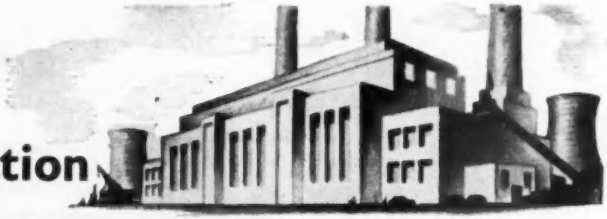
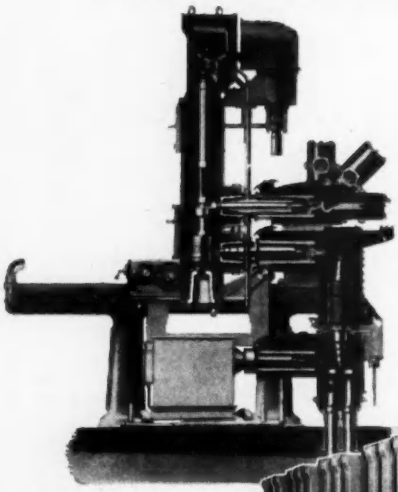


Central Station



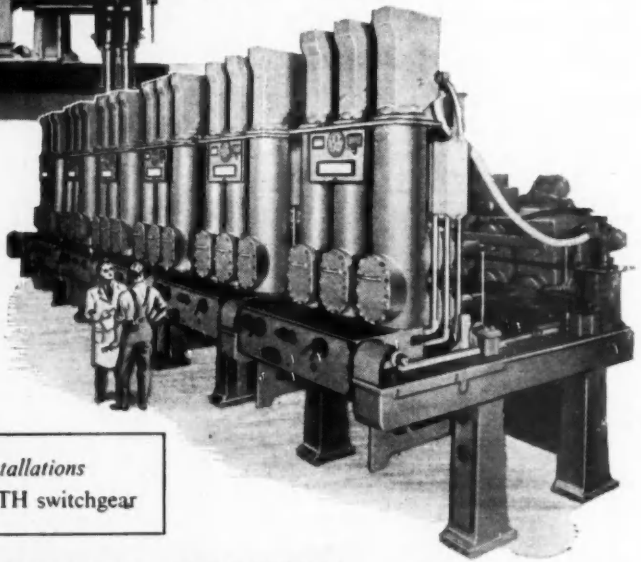
SWITCHGEAR *by*

B T-H



Functional reliability of switchgear associated with the transmission of electric power is of paramount importance. Thus many of the world's largest electric supply systems incorporate BTH switchgear. All types from low voltage industrial distribution boards to the largest circuit-breakers for systems up to 300,000 volts are manufactured by BTH.

Cross-sectional view of a typical equipment.



1,000 MVA, 33 kV, class MF29 switchgear for Pyrmont 'B' Power Station, Sydney, Australia.

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specify BTH switchgear

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A.C. or D.C.?
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VOLTAGE TESTER
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OVER 200,000 IN USE

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All Holophane lighting units are scientifically designed to provide the maximum amount of light just where it is required. This higher effective control of light has been accomplished by the use of prismatic glass, the prism being the most accurate means of light control known to science. The latest lighting unit to embody these long established Holophane principles is the "Lumilux" which is an entirely translucent unit, highly efficient and of attractive appearance.

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ELECTRIC CONSTRUCTION BOOSTS GAS AT BIRMINGHAM

The illustration is reproduced by permission of
WEST MIDLANDS GAS BOARD
J. E. WAKEFORD, Esq.
M.B.E., M.Inst. Gas E., M.Inst.F.
Divisional Manager.

This Electric Construction motor driving a booster at the Washwood Heath plant of the West Midland Gas Board (Birmingham District) is a 460 B.H.P. fully compensated D.C. machine with a speed range of 750/1750 R.P.M. It is pressure-ventilated from separate motor-driven fans.
The control gear for this motor and the rectifier which supplies it are of E.C.C. make.

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Send for illustrated leaflet and Price List.

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VOLEX ELECTRICAL PRODUCTS LTD

SALFORD, 6.

Above photograph by courtesy of
The International Electrolytic Plant Co. Ltd.

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Hewittic Rectifiers have proved to be the ideal converting plant for supplying electro-chemical processes. Apart from ease of installation, simplicity and reliability they afford maximum efficiency and economy in operation, operate entirely unattended and require practically no maintenance. Individual cubicles can be isolated for inspection without appreciably affecting the total capacity of the plant.

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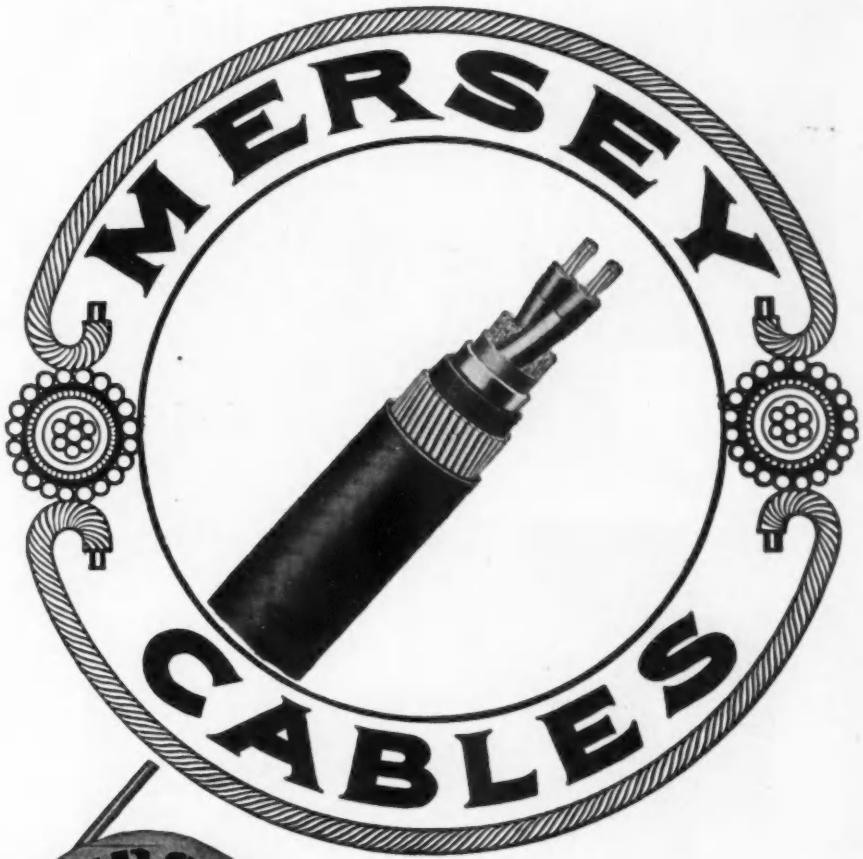

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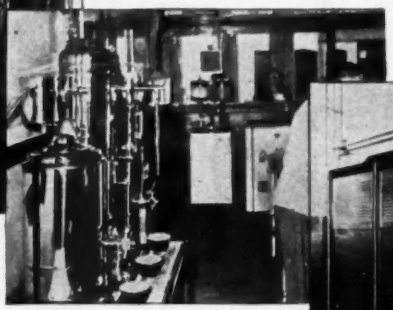
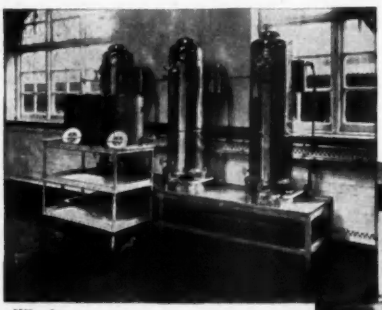
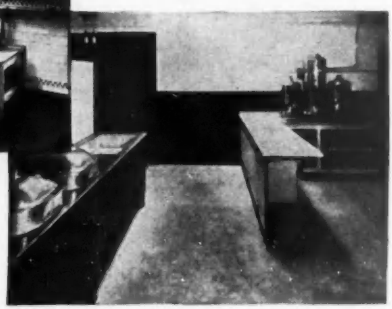


Snack and milk bar

Works canteen tea bar



Works tea-making station



Cinema cafe kitchen

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Vulcan Works Shafton Lane Leeds 11

Telephone 31088

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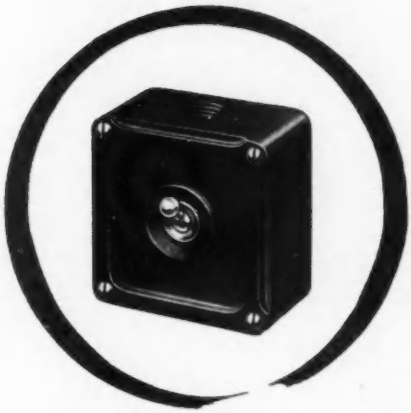

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The standing of any product in its class depends on many things, but on *none* so important as those instantly reflected in the article itself . . . appearance, workmanship and efficiency. These qualities are immediately evident in all Britmac components and establish *their position at the head of their class.*

the points in favour . . .

ILLUSTRATIONS:

5 amp., Ironclad switch units, Industrial type. Finished black enamelled with nickel plated dollies, bridges and lid fixing screws. Catalogue Numbers P.1540 (Flat lid) and P.1552 (fully protected lid). Available in 5 amp. up to 25 way; 15 amp. up to 12 way; with shallow or deep type boxes.

. . . *at every point* — "BRITMAC"

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SM BE. 3131

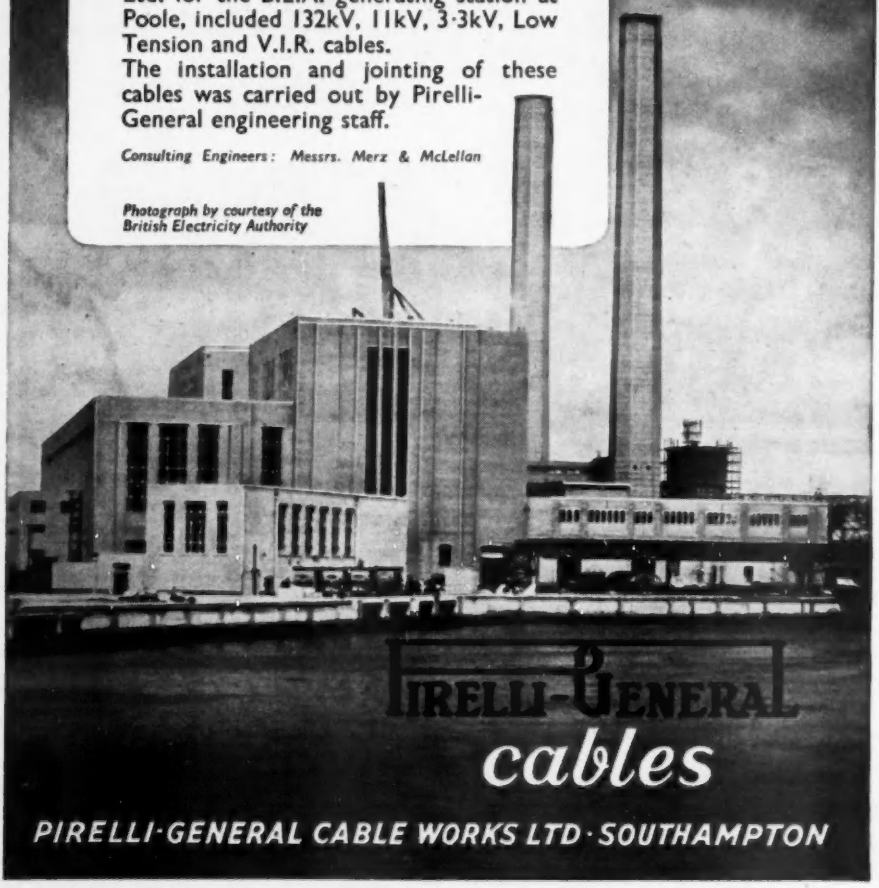
POWER

from Poole

The 90 miles of cable manufactured and supplied by Pirelli-General Cable Works Ltd. for the B.E.A. generating station at Poole, included 132kV, 11kV, 3·3kV, Low Tension and V.I.R. cables.
The installation and jointing of these cables was carried out by Pirelli-General engineering staff.

Consulting Engineers: Messrs. Merz & McLellan

Photograph by courtesy of the British Electricity Authority



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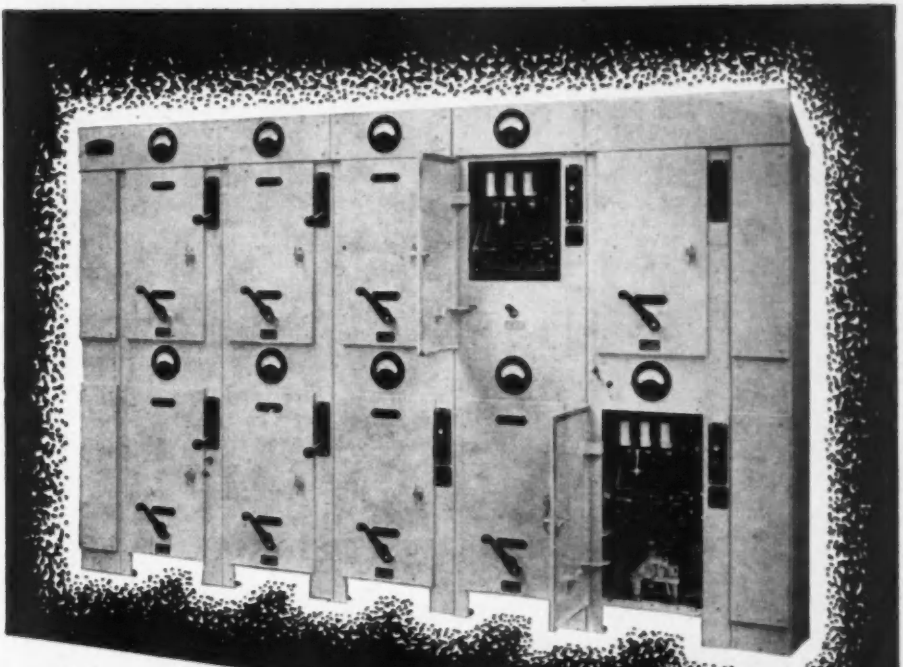

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motor control gear

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- Totally enclosed in metalclad construction
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- Unit construction permitting extensions on site
- Component items of proved ability
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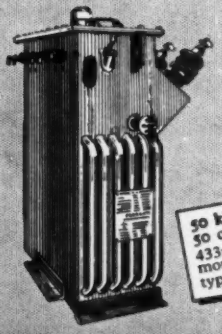
LONDON OFFICE: COLUMBIA HOUSE, ALDWYCH, LONDON W.C.2

FERRANTI LTD

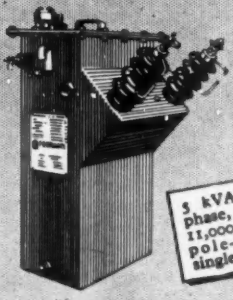
DISTRIBUTION TRANSFORMERS

Ferranti distribution transformers have been used since the earliest days of electricity supply. They are built to the new British Electricity T.1 specification in sizes from 5 to 1,000 kVA for standard 415 volt and 240 volt systems. Alternatively they can be built to customer's special requirements and operating conditions.

(Left) 500 kVA, 3 phase, 50 cycles, 11,000/433-250 volt substation transformer showing the normal tank fittings to British Electricity specification T.1.



50 kVA, 3 phase, 50 cycles, 11,000/433-250 volt, pole-mounted platform type.



5 kVA, single-phase, 50 cycles, 11,000/250 volt pole-mounted, single fixing type.

FERRANTI

FERRANTI LTD · HOLLINWOOD · LANCS

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FT121

Spotlight on Quality

ELEPHANTIDE

REGD.

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Tel: Arthington 98 & 99 Grams: Whiteley, Pool - in - Wharfedale

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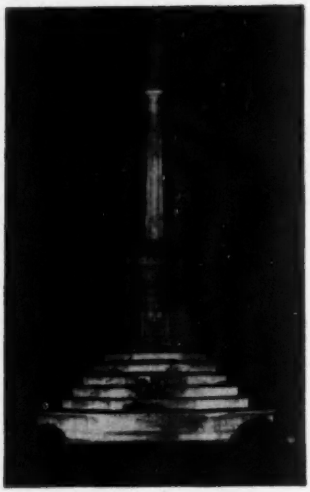

Remember REVO

★ ★ ★ ★ ★ ★ ★

THESE photographs, illustrating past and present Revo installations, give a good indication of the possibilities of floodlighting appropriate to Coronation Celebrations. Revo floodlights, suitable for all applications, are available for use with Tungsten, Sodium, Mercury and Fluorescent lamps, and a few typical examples are shown here.

REVO
REGD.

Floodlights for the Coronation

for a Royal Occasion . . .

★ ★ ★ ★

Photograph (top left) War Memorial, Oxford—a good example of concentrated lighting on an individual subject.

Photograph (bottom left) Paisley Abbey—This remarkable photograph is typical of many Revo installations.

Photograph (right) Ashmolean Museum—One of the many famous public buildings which have been floodlit by Revo equipment.

C.13106

(Above) A general purpose floodlight in sheet metal or cast iron, for tungsten lamps from 200 to 1500 w., with chromium plated reflector, hammered glass front and adjustable support.

The fitting below is one of a range of Heavy-duty Floodlights for use with tungsten lamps from 300 to 1,500 watts.

C.6428

C.13746

(Above) A heavy-duty asymmetric type floodlight, for use with 140 w. sodium lamps, comprising a cast silicon alloy body with stainless steel reflector and armour plate glass front.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

REVO ELECTRIC CO. LTD., TIPTON, STAFFS.

Whatever the instrument

it needs

THE RIGHT CONDUCTOR

—which is, of course, equally true in the electrical sense. The uniform quality of Spencer Wire has led to the enormous extent to which it is used by electrical engineers.

H.C. ELECTROLYTIC COPPER WIRE BARS AND STRIP

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The 909 KETTLE CONNECTOR

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—now available in attractive display cartons for your counter!

The only Kettle Connector with Spring Loaded Earth, adaptable to most well known makes of kettles.

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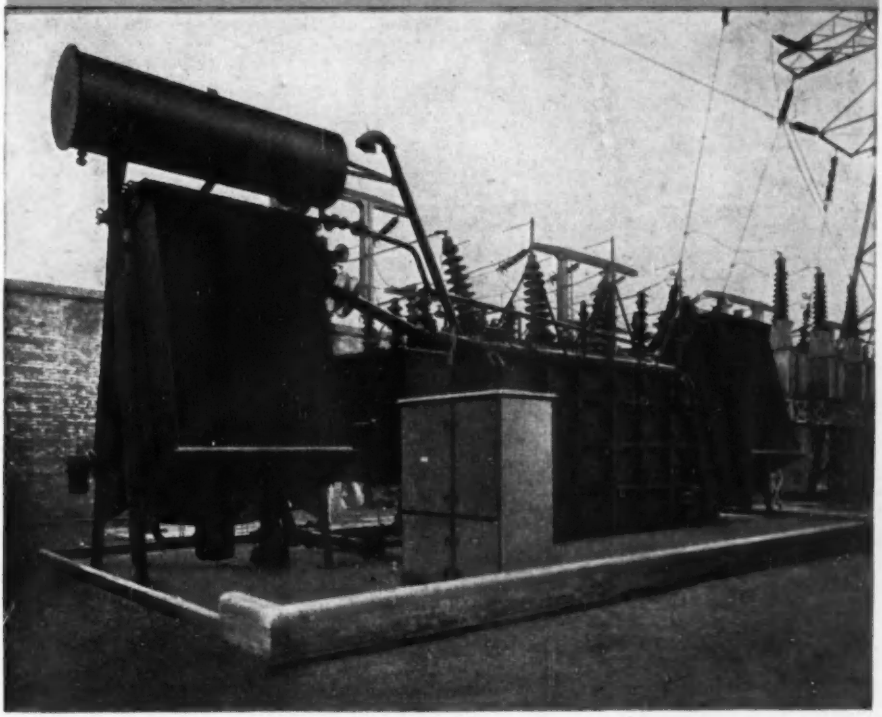
TRANSFORMERS



A 45,000 kVA, 132/33 kV transformer, fitted with 132 kV on-load tap changer, at the Newport outdoor substation of the B.E.A.

by G.E.C.

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Positively

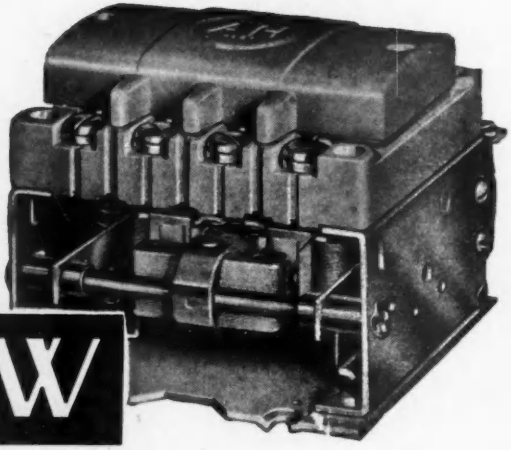
the simplest and best design in

CONTACTORS

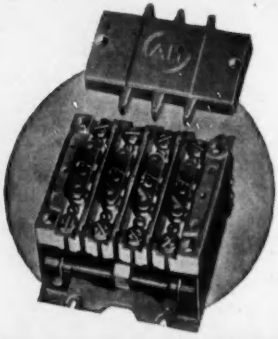
TYPE 'RA'

by

ARROW



-this design offers you-



- **A 50% saving in space over conventional types.**
- **A free-floating magnet with guided contact alignment.**
- **And a score of other good features.**

Three sizes: 25, 50 and 100 amps.
(25 amp. size only $3\frac{1}{2}$" x $3\frac{1}{2}$" x $3\frac{1}{4}$")

Write TODAY for full particulars.

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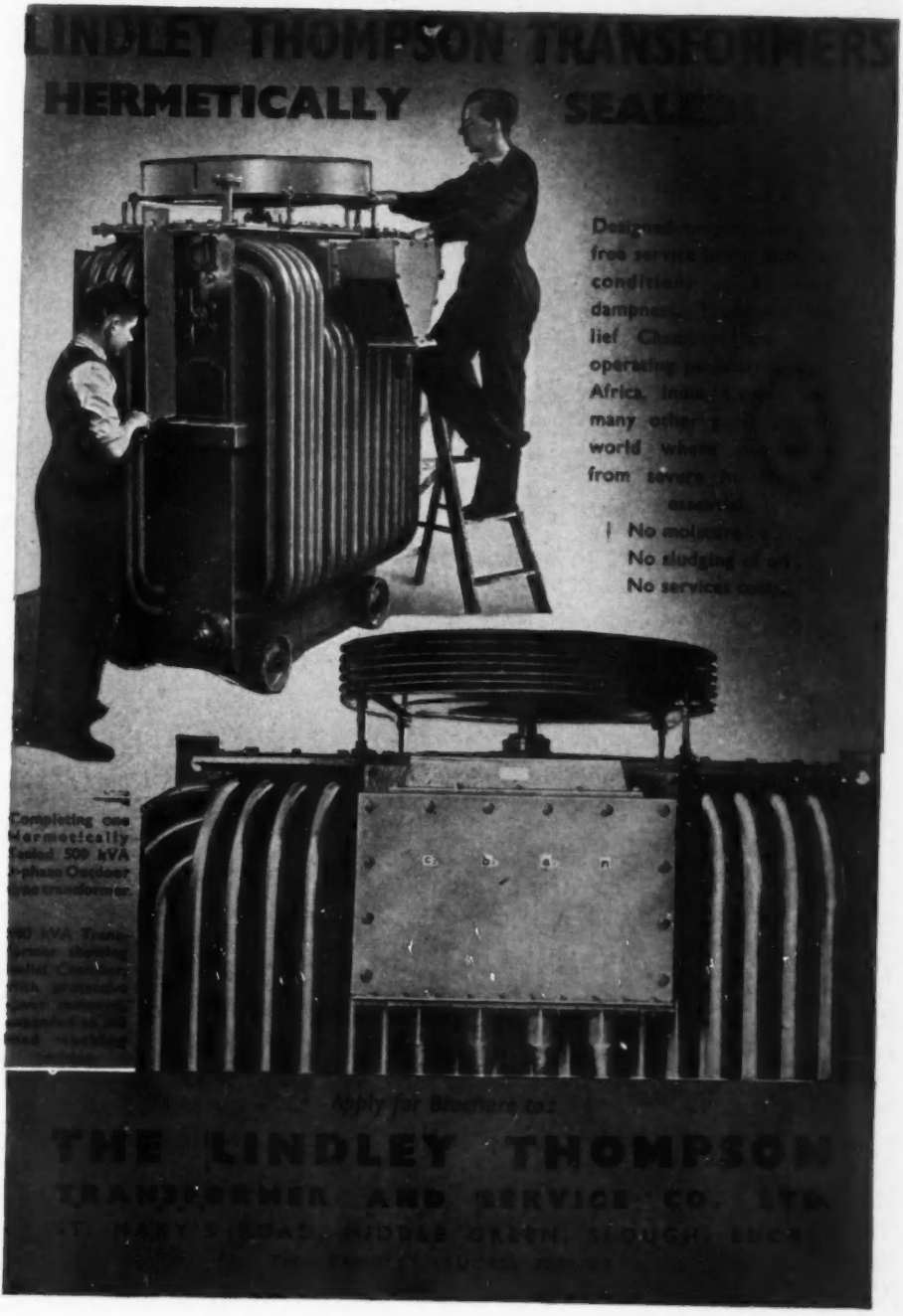
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HERMETICALLY SEALED
Completing one Hermetically Sealed 500 kVA
THE LINDLEY THOMPSON
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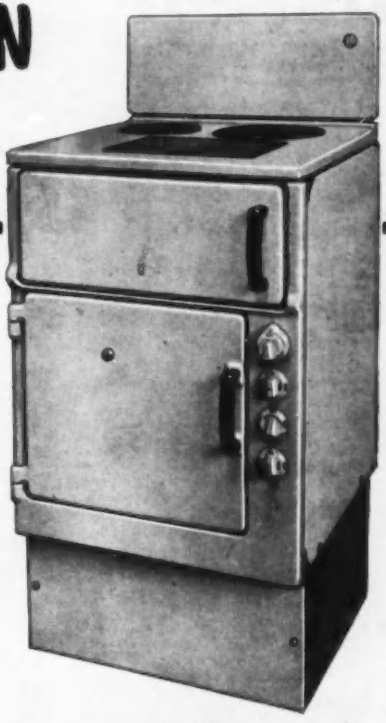
The new LOW PRICE COOKER with a BIG OVEN

The B·N·E model C.51



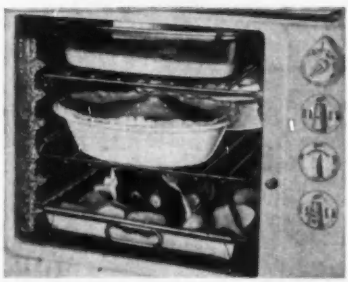
To meet present day difficult trading conditions, B.N.E. have specially designed a new cooker in the lower price range. The main attractive features are:

★ **A VERY LARGE OVEN (2,608 cub. ins.)**

★ **2-TONE IVORY FINISH**

★ **PLINTH BASE**

This cooker has the usual B.N.E. high quality and robust construction together with easy cleaning features, and 2 to 3-plate hob conversion. It complies with B.S. 1195 and EDA interchangeability standards.



PRICES:

2-PLATE	**£25.10.0**
3-PLATE	**£28.16.0**

(Because of the high costs of transport these low prices only apply to deliveries of 12 or more cookers).

Fitted with 3-heat switches suitable for A.C. supply only. Thermostatic oven control.

LOADINGS:

6½" boiling plate, 1,000 watts. 8" boiling plate, 1,800 watts. Oven, 1,800 watts. Grill Boiler, 10½" x 8", 2,000 watts.

Total: 2-plate	**5,600 watts.**
3-plate	**6,600 watts.**

A B.N.E. Product OF JOHNSON & PHILLIPS LTD.

BRITISH NATIONAL ELECTRICS LTD.

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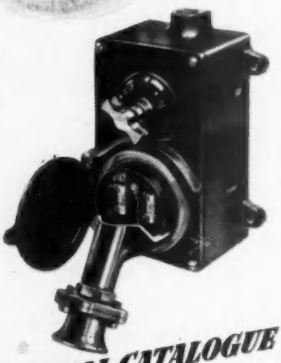
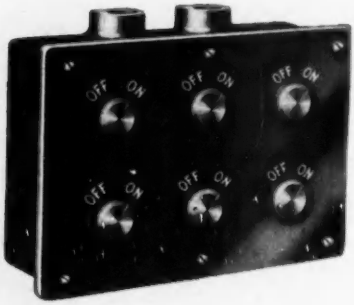
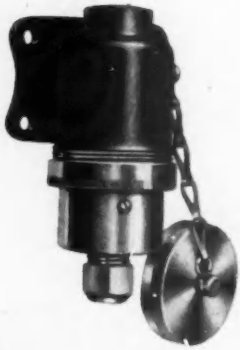
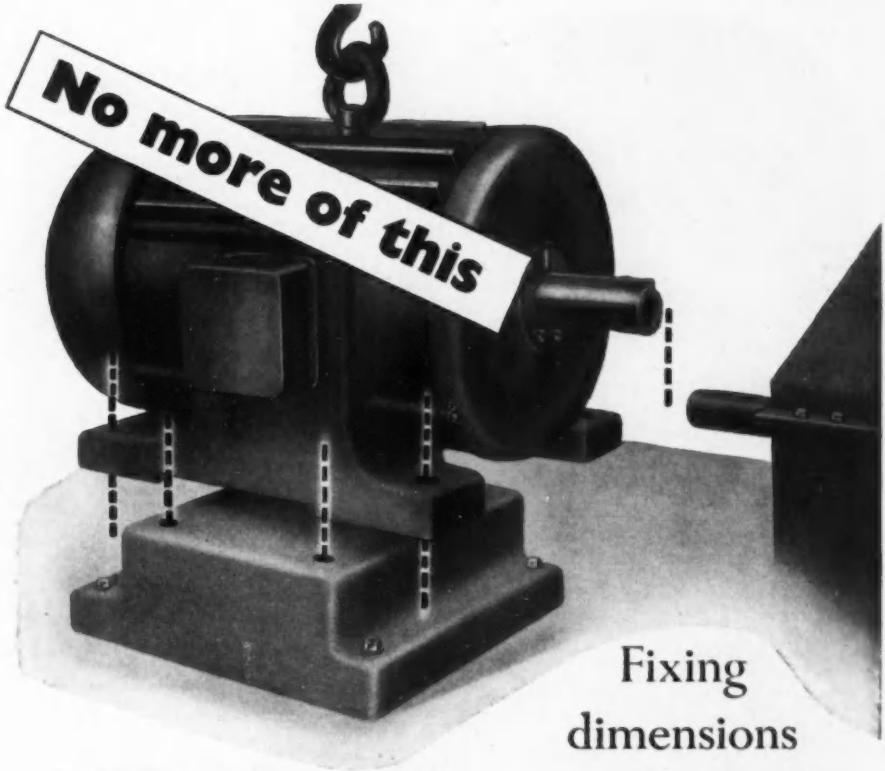


★ A COMPONENT TO SUIT EVERY SITUATION · WALSALL CATALOGUE S·P·51





WALSALL CONDUITS LTD
EXCELSIOR WORKS · WEST BROMWICH



Fixing dimensions standardized

Leading motor manufacturers in this country have collaborated in the design of a range of totally-enclosed fan-cooled, foot mounting, squirrel cage motors having outputs up to 25 hp. at 2 pole speeds. These machines, rating for rating, will all be built to the same leading dimensions which will be laid down in a British Standards specification. This move to standardise motor fixing dimensions meets a widespread demand and will ensure that when motor replacement is necessary, lost production time is reduced to a minimum.

METROVICK are manufacturing a new range of machines which comply fully with British Standard Draft Specification CN(ELE) 6814. The M.V. range is known as:

TYPE KNB MOTORS

Send for Descriptive Leaflet 26/16-1

One of the totally enclosed, fan-cooled, Type KNB motors with standardised fixing dimensions.

METROPOLITAN - VICKERS ELECTRICAL COMPANY LIMITED, TRAFFORD PARK, MANCHESTER 17

Member of the A.E.I. group of companies

METROVICK ***motors ready for world-wide service***

J/A 201

Bankside POWER STATION
HAS BEEN DESIGNED TO BURN HEAVY FUEL OIL AND THE CONSUMPTION OF THE COMPLETE STATION AT FULL LOAD WILL BE APPROXIMATELY 230,000 TONS PER ANNUM WHEN GENERATING 851,000,000 UNITS AT 30% THERMAL EFFICIENCY

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SG.19

EXPERIENCE HERE

Nechells Power Station — 12 ICL boilers, evaporating 230,000 lbs. steam/hour, fired by 'L'-type stokers.

An artist's impression of Nechells Power Station

SAVES COAL HERE

Horlicks Limited — one ICL boiler evaporating 50,000 lbs. steam/hour, firedby 'L' stoker.

Photo by courtesy of Horlicks Limited

Experience in supplying equipment to major steam-generating stations — such as Nechells — where the emphasis is on maximum steam efficiency, enables ICL engineers to design and install industrial boiler plant which saves fuel and improves production efficiency in the factories.

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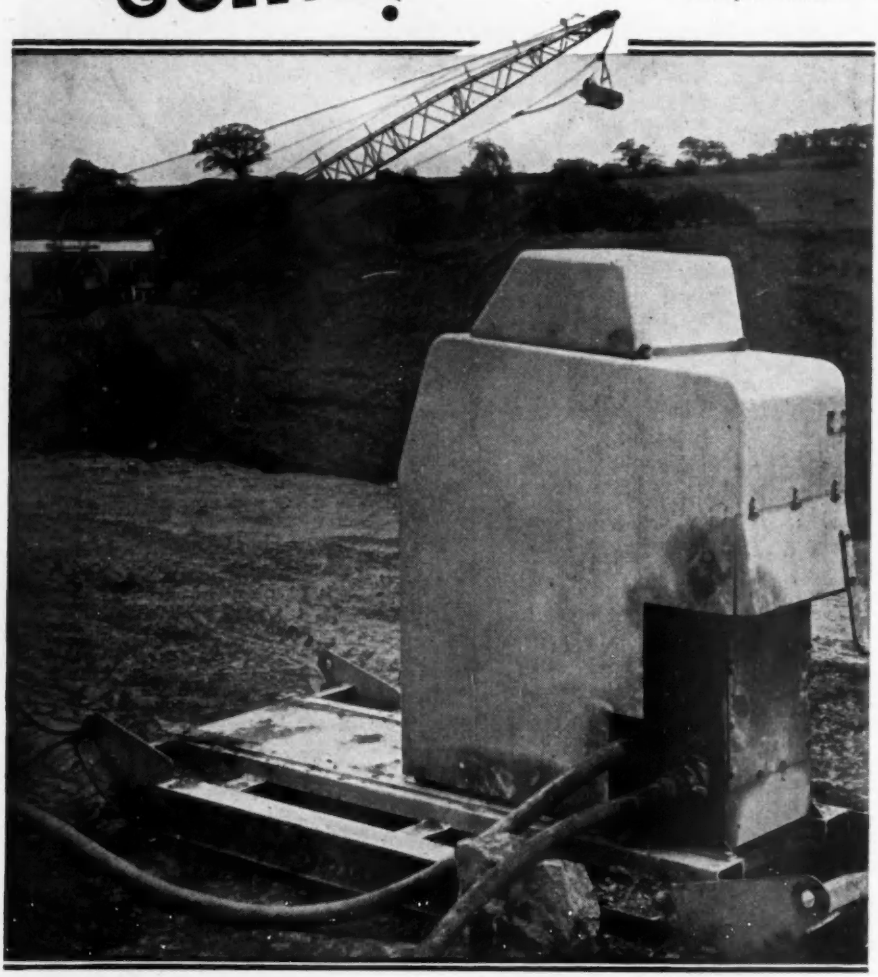
An IVIO 3·3 kV Oil Circuit Breaker (skid mounted) controlling supply to a Drag Line Equipment, grabbing open cast coal in Yorkshire.
Also for indoor use.



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METALLISATION LIMITED

Much of our customers' satisfaction is the result, we believe, of the specialised attention given by every department throughout every stage of production. In addition, Birmal offer you a Design Consulting Service, unbiassed assistance in selecting alloy and casting process, and a wide choice of specification. All of which extra facilities are part of the Birmal Service.

YOU GET MORE THAN A CASTING FROM BIRMAL

BIRMINGHAM ALUMINIUM CASTING (1903) CO. LTD. BIRMID WORKS · SMETHWICK · BIRMINGHAM 40

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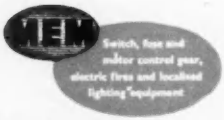

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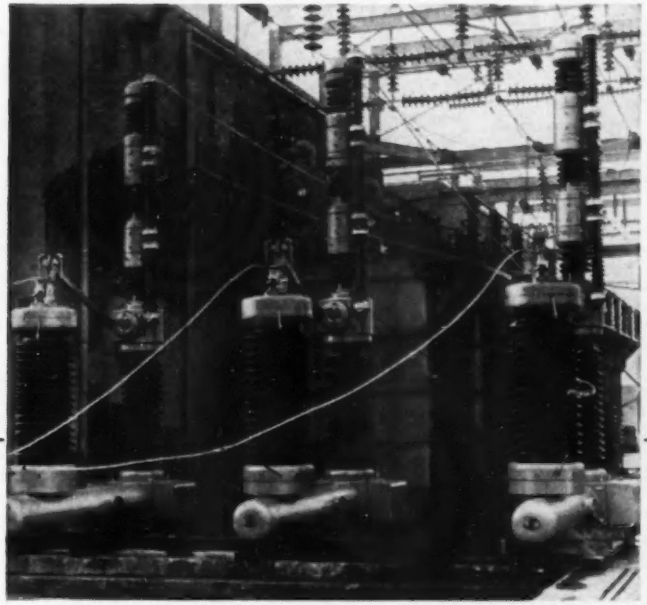
BRANCHES IN LONDON AND MANCHESTER

Unit construction under test



This 132 kV 3,500 MVA three interrupter circuit breaker is one of the range of 'ENGLISH ELECTRIC' high voltage air-blast circuit breakers using common interrupters and other standard parts.
The illustration shows the circuit breaker on short-circuit test.

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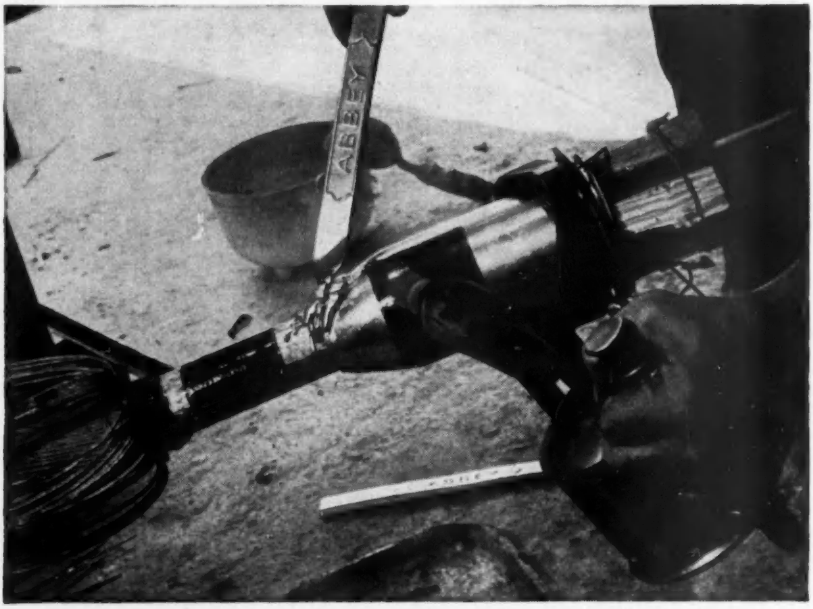

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Preparing to plumb the gland of an isolator to an 0.25 sq. in. 11 KV Cable

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ELECTRICAL TIMES

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SILICONES—AND INSULATION	47
GAS TURBINES FOR MARINE USE	50
OUR READERS' VIEWS	52
SUPPLIES AND PRIVATE GENERATION	52
FIRST STEPS TO 380 kV GRID	53
A RECORD YEAR	54
STEAM STATIONS IN AMERICA	55
NOTES ON WIRING, by Megohm	57
POWER FROM PASIR PANJANG	58
MECHANISED SERVICING OF ELECTRONIC VALVES ...	60
PROBLEMS AND PRACTICE IN ENGINEERING... ...	61
MEASURING INSULATION...	63
CHALK CRUSHING	65
LOCAL LIGHTING IN THE MINES	66
ORDERS AND OUTPUT—1952: C. A. Parsons & Co., Ltd.	67
TELEPHONES AND TELEGRAPHS	68
QUEENSLAND'S FINANCIAL DIFFICULTIES	69
BRITISH STANDARDS	70
INSTALLATIONS IN LONDON BUILDINGS	70
NEW STREET LIGHTING IN CAMBRIDGE	71
OVERSEAS NEWS	72
NEW YEAR HONOURS	74
PERSONALITIES IN THE INDUSTRY	75
THE BUYER'S COLUMN	79
THE WEEK IN NEWS	81
Electric Supply News	86
Company Activities	87
COMMERCIAL INFORMATION	88
CLASSIFIED ADVERTISEMENTS	57
INDEX TO ADVERTISERS...	66

Editor and Managing Director
ROY BALDWIN
M.I.E.E., Barrister-at-Law

Assistant Editors:—
J. K. JOHNSON
B.Sc. (Eng.), A.M.I.E.E.

K. C. POUNDS
B.Sc. (Eng.), A.C.G.I.

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Editorial

DECISION ON PLANT

THERE can be no doubt about the note of success in the British Electricity Authority's announcement that 1,539 MW of new generating plant was brought into commission during 1952. This grand aggregate not only smashed all previous records: it exceeded the most optimistic hopes which the Authority had felt able to express in its last annual report, published as recently as last October. Yet with the congratulations which must be offered there cannot fail to arise new concern for the future. Last year's record gives a new urgency to the demand which Lord Citrine has been expressing in public for some time now, that the Authority be permitted to build new generating plant at a rate commensurate with their estimate of the country's demand for power. At present the limit imposed by the country's economic planners is 1,550 MW every year, a ceiling figure which is so strikingly close to the physical level realised in 1952 that the need for some early re-assessment of Government policy is clearly apparent. The effects of the serious shortage of steel in the past months may have some effect on commissionings in the current year, though these are largely directed to clearing the back log of the plans for earlier years; but the time is obviously very near when it will be Government decisions rather than any physical considerations that set the limit to the supply industry's plant expansion. Then, as during the war, the future of the industry —sufficiency or power cuts—will rest on a political decision. It must be the right one. It must be sufficiency.

STEP TOWARDS FREEDOM

AT last one of the many Government restrictions which discriminate against electrical appliances has been removed. This welcome item of legislation, amongst the last to come into operation during 1952, takes the form of a revocation order issued last week by the Minister of Supply. It discontinues the wartime regulation requiring licensing of manufacturers of a wide range of goods, which for most items has been of little effect since an open general licence was granted in 1948. Electric fires, hotplates and water heaters, however, were definitely excluded from this relaxation, and they remained so until last week. The upper limit for which licences were granted was too low to make it worth while manufacturers expanding into the field, and as a consequence there was an artificial restriction on the range of designs available. Now that this position has changed, at least one large firm has, with commendable promptitude, announced its decision to re-enter the electric fire market. This is a brave move in the face of the luke-warm attitude to this load apparent in some supply areas, and the official discouragement so often voiced. It offers timely encouragement to those who hope to see the true worth of the use of electric fires realised afresh.

FURTHER OBSTACLES

WELCOME as this relaxation may be, it is not likely to lead to a new flood of electric heating appliances in retailers' shops. There has been no serious gap between customer demand and the supply of reputable models, and any slightly wider choice that may become available is unlikely to trigger off a buying spree. Restrictions remain in many forms, both physical and financial. Limitations on the supply of materials must severely narrow the possibility of extending either quantity or number of types. Purchase tax is still being used as an administrative weapon to bias the public against electrical appliances, and above all, the campaign to damn electrical methods of comfort, space and water heating is still proceeding, even though it has received

some severe set-backs in the last few months. All these contrary influences have to be successfully countered and neutralised before the electrical appliance manufacturer can consider that he is receiving a fair deal. Nevertheless, this single relaxation so far allowed is a hopeful augury for the new year.

POTENTIALITIES OF SILICONES

THE introduction of any new material is generally heralded with a fanfare of imaginative publicity. This is followed by a hiatus during which processing and manufacturing difficulties are solved, and design staffs begin their first tentative steps to embody the new material in practical machines. From the experience gained in this intervening period comes the technical and economic assessment of the value of the invention. Such a point has been reached with the silicone polymers, which are now consolidating their position among the basic materials of electrical engineering. The glass-silicone laminates with their remarkable physical and electrical characteristics, together with silicone rubbers which are anti-tracking and capable of withstanding high temperatures, represent, despite their importance, only part of the silicone story: there are other widespread and vital applications. When, however, large-scale production gets under way, it is probable that in this case at least, the early prophecies may well achieve fulfilment.

EFFICIENCY WITH MERCURY

WITH very few mercury-cycle generating stations in commercial operation, operating experience in any such plant is a matter of wide interest. So far, that at the most recent American station of this type, which is located in New Hampshire, has been uniformly successful, with the high thermal efficiency of 37·3% sent out recorded on test, and a 36·4% average for a year's operation. The plant concerned comprises a mercury-boiler supplying two 7·5 MW mercury turbines, which exhaust into condenser-boilers. These, in turn, supply steam at 600 lb/sq in., 850° F to a further 25 MW ordinary condensing steam turbine, the complete generating unit being operated by a shift staff of six men. Problems peculiar to mercury plant have been successfully overcome to give an availability over a year of better than 86%, and sufficient flexibility to permit short-period shut-downs. Nevertheless, it is inevitable that a plant so different from the normal steam design should have its special problems, and two of these are worthy of special mention. The first, associated with the boiler, concerns oxides formed by additions to the mercury. Special off-load draining procedures are necessary to prevent these being baked into solid plugs in boiler tubes and so interfering with circulation. More general is the special difficulty of minimum load. One mercury turbine working at 2 MW evaporates enough steam to generate a further 5MW. The resultant minimum plant load of 14 MW with both mercury turbines working is a serious embarrassment in some operating conditions, especially when cheap hydro energy is available to the system.

UNRESTRICTED SUPPLIES

RECOMMENDED last September by Lord Ridley's committee, the "permanent and public" abandonment of restrictive agreements on electricity supplies is now an accomplished fact if consumers desire it. In making the necessary announcement on behalf of the area boards, the British Electricity Authority is largely making public recognition of existing practice, and so carrying out a promise made some while ago. It has gone further, however, in putting into effect another Ridley Committee proposal, concerning the principles of charging for power supplies when restrictive agreements are abandoned. The basis to be adopted is necessarily that of meeting actual costs, so that there shall be no undue preference for one class of consumer. The charges resulting from the application of this principle may well provide something of a shock to the protagonists of private generation, and reveal that there was more merit in some of the existing schemes than had been realised.

Meteor

SILICONES —*and Insulation*

APPLICATIONS OF THESE MATERIALS IN THE CABLE AND WIRE INDUSTRY

THE use of electrical equipment under extreme temperature conditions considered impracticable a few years ago has depended to a considerable extent on the development by manufacturers of suitable connecting cables. And "hot-spot" connections in aircraft, industrial and telecommunication equipment must withstand sustained operating temperatures more than double those associated with cables and wires having normal organic insulation, whilst for other applications the ambient temperature may be well below freezing point.

Need for New Dielectric

These applications and many others have emphasised the need for a dielectric material with characteristics rather different from the other well-established high-temperature cable insulants such as asbestos and glass. They require a homogeneous material having the characteristics associated with rubber and plastic insulation, but combining, with the flexibility and resistance to moisture of these, the ability to withstand continuously, without deterioration, a wider range of working temperatures.

Such a material is silicone rubber. Although comparatively new, its practical application has been successfully achieved by British Insulated Callender's Cables, Ltd., and silicone-rubber cables and sleevings now form an important addition to the company's wide range of products.

Silicone Rubber

Silicone rubber, or "Silastic," is outstanding in its ability to withstand extremes of temperature without deterioration. It is not a thermoplastic and retains its dielectric qualities and rubber-like elasticity at working temperatures ranging from −60° C to as high as 150° C.

Generally speaking, it does not flake or crack and is comparatively odourless at high temperatures. Silicone rubber swells in oil, but the swelling generally does not indicate serious deterioration. Like all silicones, the material is water-repellent and substantially unaffected by moisture at normal temperatures, although continuous exposure to steam is not advisable.

This combination of elasticity, moisture resistance and high temperature stability make silicone rubber extremely valuable as a cable insulant, although its cost is comparatively high at the present stage of development and

Some examples of cable now being made by B.I.C.C. using silicone rubber are shown below

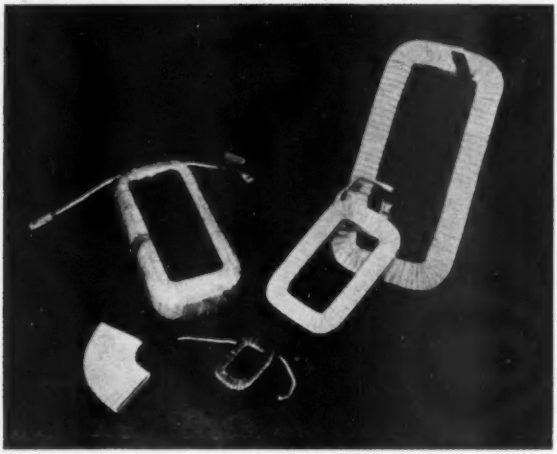
1. *Flexible stranded silicone-rubber insulated lead*
2. *Flexible stranded cable, silicone-rubber insulated, asbestos-braided and aluminium sheathed*
3. *Single conductor silicone-rubber insulated cable, asbestos-braided and lead-sheathed*
4. *Flexible stranded single-core cable, silicone-rubber insulated, asbestos-roved, asbestos-braided overall*
5. *Flexible stranded silicone-insulated wire, with asbestos-braid, glass-braided overall (Uniglasil)*
6. *Twin-core flexible stranded cable, silicone-rubber insulated, asbestos-filled, asbestos-braided and glass-braided overall*
7. *Twin-core flexible stranded cable, silicone-rubber insulated, asbestos-filled and asbestos-braided overall*

the resistance to mechanical damage somewhat limited; it has, however, many applications that cannot be fully satisfied by other materials. Such applications include thermocouple leads wiring for drying-kilns, boiler-houses, furnaces, ovens, ships' engine-rooms and in aircraft, and connections to high-power filament lamps, projectors and immersion heaters. Cables and flexible cords with silicone-rubber insulation can be supplied in a wide range of sizes, and connecting wires and insulating sleevings are available in various sizes and colours. In the manufacture of silicone-rubber insulated cables the material is initially prepared by a milling process and then applied by extrusion under controlled conditions of temperature and pressure over the conductors. The insulation is subsequently cured at a high temperature.

Extra Protection

Some further protection is usually required for silicone rubber insulation, except for connecting wires and wires totally enclosed in equipment or otherwise shielded against abrasion and damage. Such protection normally consists of an asbestos felting and a glass or asbestos braid which maintains the heat-resisting properties of the cable. The braid is finished with silicone varnish or fire-resisting compound in a range of colours.

Other forms of protection include steel wire armour, where mechanical protection is important, or for installation in steamy atmospheres, the cables can be lead sheathed.



Typical coils insulated with Silastomer tapes

Applying Silastomer tape to a traction motor field coil

Silastomer "R" Tapes

Apart from its use as "Silastic" rubber, Silastomer may be used in many other forms. In the electrical industry tapes are used in numerous processes, and here the properties of silicones may be well exploited.

The tape consists of semi-cured Silastomer based on glass cloth and it is produced in thicknesses ranging from 0·010 to 0·020 in. After heat curing it retains its physical, chemical and dielectric properties at temperatures within the limits of —55° C to 250° C. Dielectric properties at normal temperatures are comparable with, and at elevated temperatures superior to, the best resilient insulating materials. It is also resistant to lubricating oils and to a variety of chemicals. Unlike the normal resinous coatings and insulating materials, it does not become brittle with age or at high temperatures, and retains its moisture-proof and dielectric properties.

Physically, the tensile strength of the tape is 50 lb/in. width for the 0·010 in. thick tape, rising to 60 and 90 lb/in. width for the 0·015 and 0·020 in. thick types respectively. Dielectric

Applying Silastomer cloth to a preformed coil

strength is good, being between 250 to 350 volts/mil with 2 in. electrodes at all temperatures between 25° and 260° C. Power factor is 0·010 at 100 c/s, 0·006 at 10 kc/s and 0·003 at 1 Mc/s; these figures are for conditions of 25° C and 50% r.h. The dielectric constant under the same conditions and for the same frequencies has values of 3·8, 3·7 and 3·65.

Application

Ease of handling and curing, excellent dielectric and chemical properties and high thermal conductivity make Silastomer "R" tape ideal for many electrical insulating applications. When used as an outer wrapping for field and armature coils, transformer coils and solenoids, it vulcanises to form a moisture-proof and oil-resistant jacket. In applications where vibration is severe, this tough, resilient and extremely flexible material will solve many difficult insulation problems.

In some instances it may be desirable to coat the coil with a paste before taping; the recommended grade is Silastomer 123. This will fill the voids due to irregularities in the coil winding and ensure bonding of the tape jacket to the coil structure. Silastomer 123 is also recommended to seal the leads coming out of a coil.

A special adhesive, Silastomer 111, is used to cement Silastomer wrappers during the fabrication of armature coils. The adhesive may be brushed on to the wrapper or it may be applied directly to the armature coil. Silastomer 111 contains a solvent and it is necessary to air-dry the coated wrapper or coil for at least 30 minutes before taping the coil. Unless this is done, the trapped solvent will cause deterioration of the Silastomer tape. Curing of the adhesive takes place during the tape-curing process. Silastomer 111 is a solvent dispersion and will thicken in time due to solvent evaporation. The dispersion may be thinned down with good quality benzene or with high-boiling petroleum ether, according to the rapidity of drying required.

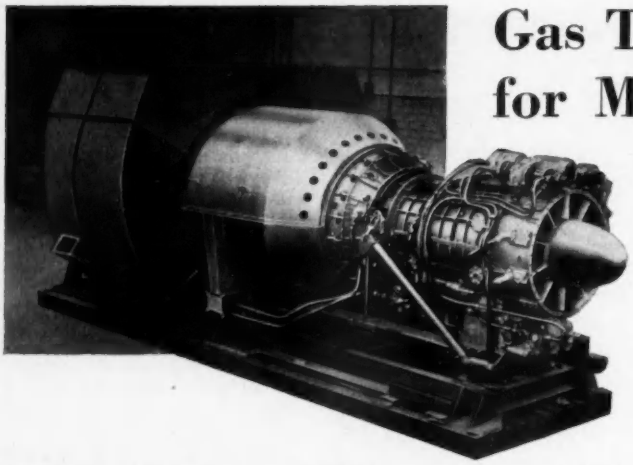
Satisfactory results will be obtained with Silastomer "R" Tape if it is cured as recommended; uncured organic varnishes, oils, adhesives and organic solvents inhibit vulcanisation. Coils and other constructions must, therefore, be clean, dry, and free from uncured resins or varnishes before Silastomer "R" Tape, Silastomer 123 or Silastomer 111 are applied.

Silicone (Class-H) insulating materials should be used with Silastomer "R" Tape to secure maximum heat and moisture resistance. Silicone (Class-H) insulating materials include silicone-bonded glass-covered wire, silicone-varnished glasscloth and sleeving, silicone-bonded mica-glass combinations, silicone-glass laminates, Silastomer-covered lead wire and silicone insulating and impregnating varnishes.

Curing Schedule

Silastomer "R" Tape becomes vulcanised in 15 minutes at 150° C (302° F). It can be vulcanised and cured in an air-circulating oven. The actual time in the oven depends upon the mass of the unit and the thickness of the taped section. Fifteen minutes should be allowed in addition to the time required to raise the temperature of the Silastomer to 150° C (302° F). In units which operate at temperatures of 150° C (302° F) or higher, Silastomer "R" Tape may be vulcanised in use.

It is generally desirable to give Silastomer-insulated coils an additional cure at 200° C (392° F) or at the maximum operating temperature of the coil, whichever is the higher. To avoid the possibility of sponging or blistering in sections $\frac{1}{16}$ in. or more in thickness, final curing should be done by increasing the temperature from 120° C (248° F) to 200° C (392° F) at a rate of 20° C per hour. The coil should then be held at 200° C (392° F) for 4 hours. Our thanks are due to B.I.C.C., and Midland Silicones Ltd., makers of "Silastic" and "Silastomer" for the information given in this article.



Gas Turbines for Marine Use

New G.2 propulsion units for Admiralty are development of the open-cycle "Gatric" unit

A general view of the complete unit

THE gas turbine, as a means of ship propulsion, is a most attractive proposition, and considerable experimental and development work has been carried out in the past few years. The first ship actually to be propelled by a gas turbine was M.G.B. 2009, which put to sea on July 14, 1947. This embodied a Metropolitan-Vickers 2,500 s.h.p. open-cycle unit and, following its successful operation, the Admiralty placed an order with the firm for four further units, known as the "G2," employing the same cycle as the original "Gatric" unit, but with a much higher output. These G2 units were originally designed to develop 4,800 s.h.p., but operational experience has resulted in a downgrading of the rating to 4,500 s.h.p. maximum, with a m.c.r. of 4,000 s.h.p. The gas turbines are used only at high speeds and are designed for a total life of 1,000 hours, of which 300 may be run at maximum power. Diesel engines are provided to supply the necessary power for cruising and manoeuvring.

The G2 is divided into two sections: the gas generator, consisting of the compressor, combustion chamber, compressor turbine and auxiliaries; and the power turbine, mechanically independent of the gas generator, which drives the propeller shaft through a single-helical, side-pinion, reduction gear. Power/weight ratio of the complete unit is only 2·16 lb/h.p.

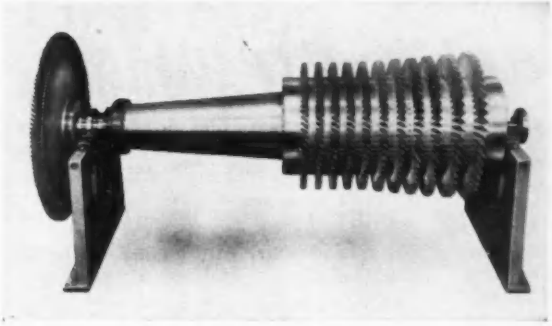
Essentially, the gas generator, which has a maximum speed of 7,830 r.p.m., is that of a Beryl aircraft engine, and comprises an 11-stage compressor driven by a single-stage turbine. Maximum temperature at the entrance to the nozzle guide vanes of the turbine is in the region of 806° C.

With a maximum design speed of 5,200 r.p.m., the power turbine rotor consists of three Firth-Vickers austenitic steel forgings welded together and carried by one ball bearing and one roller bearing each lubricated by an oil mist. Mean gas temperature at the power turbine inlet as measured by four thermocouples is 660° C. The gearing gives an overall ratio of 4·73, resulting in a maximum propeller speed of 1,100 r.p.m.

Control

Control of the power output is exercised solely by the quantity of fuel supplied to the combustion chamber of the gas generator. To provide the fuel, a high-pressure pump, driven from the compressor rotor, delivers 630 gallons/hour of oil at a pressure of 600 lb/sq in. at a pump speed of 3,620. The main control valve consists essentially of a servo-operated calibrated needle which moves in an orifice. Emergency overspeed trips are fitted to both rotors, and a ported-sleeve governor is fitted to the gas generator shaft. This governor throttles the main oil supply to the burners.

Lubrication is fairly straightforward. On starting, an electrically-driven auxiliary pump circulates oil from the gearbox sump to the gear teeth and the thrust block. When the propeller shaft is turning at about 350 r.p.m., a turbine-shaft-driven pump takes over and supplies oil from the main tank to the gearbox. The roller and ball bearings supporting the gas generator and turbine shafts are lubricated by an oil mist formed by spraying in oil by compressed air tapped off from the compressor; this oil is not



The gas generator shaft showing compressor and turbine blades

recovered. Mist lubrication is also used for the overspeed governor.

As the trailing of the propeller, when the vessel is cruising on the diesel engines, rotates the power turbine, an auxiliary lubricating pump driven from the turbine shaft supplies oil to the bearings. Damage to the bearings of the gas generator rotor due to vibration is prevented by rotating it slowly by an electrically-driven inching motor.

For starting purposes, a lightweight compressed air motor is used, supplied with high pressure air at 450 lb/sq in. from storage bottles via a reducing valve. This motor runs the gas generator up to about 2,000 r.p.m. at which speed the unit becomes self-sustaining. Compressed air, tapped off the compressor at various stages, is used for many tasks such as oil-mist lubrication, cooling of bearings, cooling of turbine discs, forcing of distilled water for blade-cleaning, operation of the gearbox overspeed trip mechanism and thrust balancing.

Electrical System

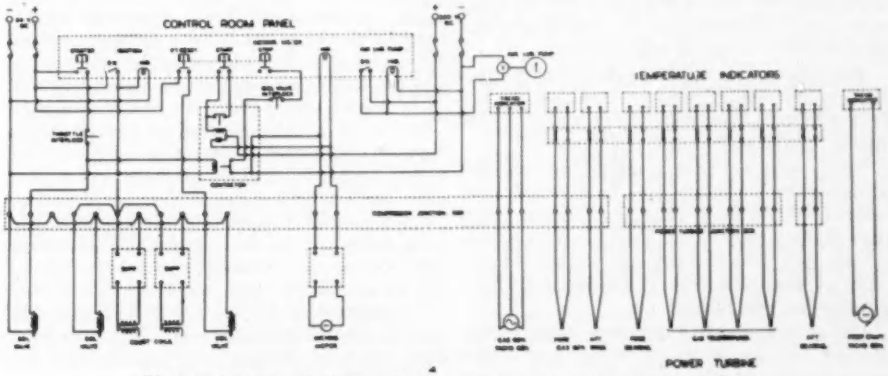
The electrical system is divided into three sections: 24-volt d.c. circuits, 220-volt d.c. circuits, and the various instrument circuits.

Three solenoid valves and two ignition boost coils operate on 24-volt circuits. One solenoid valve controls the supply of fuel to the igniters. Of the other two, one controls the supply of high-pressure air to the starting motor, and the other controls the air supply to the power turbine emergency governor reset piston. The two ignition boost coils supply the high tension current to the spark plugs used to ignite the two torch igniters in the main combustion chambers.

The control systems for the inching motor and the auxiliary lubricating oil pumps are the main 220-volt d.c. circuits.

In both the 24- and 220-volt d.c. circuits, suppressors are supplied to prevent interference by the boost coils and the inching motor. Limit switches, mechanically connected to the fuel control and isolating valves, are interlocked electrically with the solenoid valve for the starting motor, and with the inching motor and its contactor. This arrangement ensures that the starter motor solenoid valve cannot be energised if the fuel control valve is open, and also that the inching motor cannot be started when either the starting motor solenoid is energised or the fuel isolating valve is open.

Extensive bench tests were carried out on the G2 engines, and showed the performance to be considerably better than those of the 2,500 s.h.p. gas turbine. The new G2 gas turbines are at present undergoing sea trials.



Electrical circuits, including the main instrumentation, are shown above

Our readers' views . . .

Electrical Interlocks

THE recent accident on Tower Bridge, when the bascules were raised during the passage of a bus, could easily have been avoided by using a simple electrical interlock system operated from vehicle actuated pads placed in the roadway. Such a system could readily be made to ensure that no traffic was on either of the bascules or moving on the approaches when the raising operation was begun.

A similar installation to the one I envisage has been in operation for several years at Aylesford, Kent, where it controls single line traffic over a narrow bridge with a blind approach. By counting successively the impulses produced in a number of pads by the passage of a vehicle across the bridge it ensures that the bridge is clear—irrespective of the speed of the vehicle—before releasing traffic waiting round the blind corner.

The cost of such an installation, would probably be less than the compensation to be paid to the victims of this unfortunate occurrence.

C. Oppenheimer

LONDON, W.C.1.

◆ ◆ ◆

Rheumatism and Electric Fires

YOUR correspondent thinks it only fair to makers of electric fires, and to the British Electricity Authority (who supply the current), that he should give his experience. This relates primarily (but not exclusively) to those who may unfortunately be suffering from rheumatism in knees or hip-joints.

For five years, he has suffered with continually increasing trouble and last winter (1951) he could not walk across the room, at times, without experiencing serious pain.

The remedy has been to use an ordinary one kW radiator in a special way, by day, and a hot water bottle by night (also in a special way). The result is that all the terribly cold weather of the past two months was happily passed with, at times, hardly a consciousness that the rheumatism was present.

Owing to pressure of business, your correspondent is unable to be drawn into direct correspondence with individuals, but feels that makers of electric fires might be interested. Sufferers might then be able to apply to manufacturers for advice.

"A Sufferer"

FLINTSHIRE.

[Letters addressed to this office will be forwarded.—Ed.]

◆ ◆ ◆

Temporary Wiring

WE are rather surprised that in his otherwise very complete article in your issue dated December 11, 1952, Mr. W. E. Steward omitted any reference to P.V.C. flexible conduits, which are likely to prove very popular for floodlighting wiring. This material may be run underground through gardens, etc., and self-threaded into the projector conduit entry, giving a completely weatherproof joint. Further, after recovery, the conduit may be reused for any purpose.

R. G. Hardy

GILFLEX CONDUITS LTD.,
WATFORD

SUPPLIES AND PRIVATE GENERATION

IT has now been announced by the British Electricity Authority, that as stated by Mr. Geoffrey Lloyd in the House of Commons on November 24, the electricity boards intend to implement one of the Ridley Committee recommendations on private generation. This suggested that electricity boards should publicly and permanently abandon restrictions on the period during which private generating plant could be run, in cases where the main supply to the factory was from the electricity board.

It has now been stated that if any consumer desires to use public plant in circumstances which would contravene the provisions of his agreement with the electricity board concerned, the board will be prepared to enter into a new contract which will reflect the costs of connecting and supplying the consumer while leaving him free to use his private plant.

In connection with the last part of this statement, it is of interest to note that the Ridley Committee also recommended that the principles on which prices would be fixed for standby supplies should be stated.

First Steps to 380 kV Grid

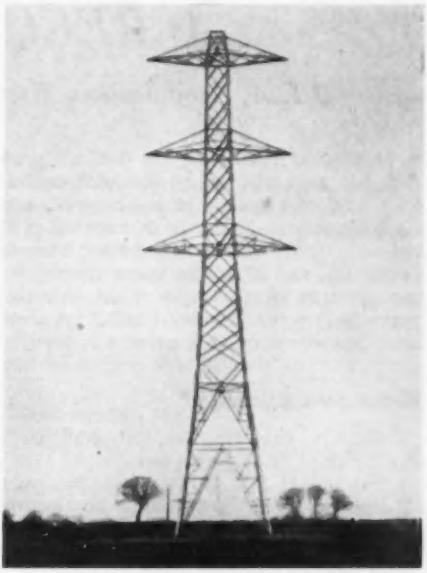
Tilbury the Site for New Development in Bulk Power Transmission

STANDING out over the flat fields of Essex can now be seen a new landmark, the first tower of the ultra-high tension line between Tilbury and Elstree, and the first 275 kV double circuit tower designed for ultimate operation at 380 kV as a part of this country's supergrid system. It will be remembered that the Newark-Staythorpe line, also a part of this network, is single circuit, operating initially at 132 kV and ultimately at only 275 kV. This voltage will be the standard for the network when it comes into operation between 1955 and 1960, but as at a later date it may prove desirable to increase the operating voltage to its present maximum of 380 kV, provision for this increase has been made in towers being erected on the Tilbury-Elstree route.

High Tensile Steel Used

Another distinguishing feature of these towers is the entensive use of high tensile steel. This metal has been adopted to minimise weight without sacrificing strength, legs and main braces being constructed from it, whilst mild steel has been used for secondary braces. The overall weight is about 11 tons. Of Blaw-Knox design, the tower was fabricated by Painter Bros. Ltd., and assembled on site. At this company's Hereford works a similar tower was tested to destruction. Erection, the responsibility of the J. L. Eve Construction Co. Ltd., was started in the late summer and has been progressing satisfactorily, taking into account adverse weather conditions.

Rising to 136 ft 6 in. in three stages of taper, the tower presents a graceful appearance at which few country lovers should cavil. This differs considerably from the tower also to be used for 275 kV on the Staythorpe-Newark route which is of 'waisted' lattice steel design and which was illustrated in last week's issue of the ELECTRICAL TIMES. Conforming to normal practice, nearly all the lattice work on the new tower has been bolted together, although in one or two cases end plates have been welded to girders to aid construction.



The first tower of the new grid, and, in the distance, the second in the course of erection

Despite the increased height, normal foundations were considered sufficient, each 10 ft 6 in. stub set in concrete and spaced 24 ft 6 in. apart. The cross arms, varying in width from 36 ft to 40 ft from upper to lower will support twin 0·4 sq in. (copper equivalent) conductors, spaced at 12 in. at the yoke, this being one of the accepted standards for operation at higher voltage to minimise corona. The vertical spacing between lines will be 25 ft 6 in. between upper and centre conductors at the tower, and 3 in. greater between centre and lower conductors.

As insulators for 380 kV have yet to be designed, those to be fitted on the towers will be for 275 kV only, and will probably be of the glass cap and pin type having an ultimate strength of 30,000 lb. Normally, such a suspension arrangement would include 18 insulators which having an overall length of 11 ft 6 in., would leave a clearance below of 14 ft (approximately).

This section of the route is straight line, having nominal spans of 1,200 ft. In all, over 200 towers will be erected on the 45 mile route between Tilbury and Elstree, to connect, with the national system, the generating station to be built at Tilbury.

A RECORD YEAR

B.E.A. Commissions More Than 1,500 MW New Plan

NEW plant installed by the British Electricity Authority during last year totalled 1,539 MW on a sent-out basis, a record-breaking achievement. This total is made up of 34 turbo-alternators having an aggregate rating of 1,550 MW, and 59 boilers whose evaporative capacity was 16,985 klb/hr. Thirty-two stations are involved, seven of which have come newly into operation during the year.

Estimates Exceeded

Estimates published in the Authority's fourth report in October had put the year's commissionings at 1,400 MW sent-out on a basis of "what may be possible if nothing untoward affects existing plans." In exceeding this forecast, the Authority has brought the actual rate of commissioning of the years 1951 and 1952 taken together up to the maximum planned total of 2,650 MW.

For 1953, the maximum planned rate of commissioning is 1,500 MW. However, during the past months shortages of steel and other materials have imposed some delays in the early constructional work associated with new stations and extensions. As a result of this, it is officially stated that there may be some difficulty in achieving the target.

Four new stations came into use in December, Bankside, Brighton B, Littlebrook C, and Uskmouth A. Bankside is, of course, in the London division, and has 60 MW B.T.H. machines and 375 klb/hr oil-fired boilers supplied by Foster-Wheeler. Steam conditions are 900 lb/sq in., 900° F. Brighton B, in the South Eastern Division, is another 900 lb/sq in., 900° F. station, with 52·5 MW Richardsons Westgarth turbo-alternators and 320 klb/hr Babcock and Wilcox boilers.

Littlebrook C, also in the South Eastern division, has 60 MW sets supplied by C. A. Parsons, while the boilers are 360 klb/hr units of International Combustion manufacture. Finally comes Uskmouth A, near Newport, in the South Wales division, which is another station having 60 MW alternators. These are of G.E.C. manufacture, while the steam for this 900 lb/sq in., 900° F. station is raised in B. & W. 360 klb/hr boilers.

Station	Division	Turbo-alternators			Boilers			H.P. Pipework Maker
		No.	Rating MW	Maker	No.	Rating k lb/hr	Maker	
Bankside* ...	L	1	60	B.T.H.	2	375	Foster Wheeler	Parsons
Barking C* ...	L	1	75	B.T.H.	—	—	—	Aiton
Battersea B ...	L	—	—	—	2	425	Babcock & Wilcox	Aiton
Blackburn ...	NW	1	40	E.E.	3	150	Simon Carves	Babcock & Wilcox
Blackwall Point ...	L	1	30	E.E.	1	365	Babcock & Wilcox	Babcock & Wilcox
Braehead ...	SWS	1	50	Parsons	2	300	Babcock & Wilcox	Babcock & Wilcox
Brighton B* ...	SE	1	52·5	R.W.	2	320	Babcock & Wilcox	Parsons
Bromborough ...	MNW	2	50	E.E.	2	300	Babcock & Wilcox	Stewarts & Lloyds
Brunswick Wharf	L	2	52·5	M.V.	4	320	Clarke Chapman	Parsons
Clarence Dock ...	MNW	—	—	—	2	350	Babcock & Wilcox	Stewarts & Lloyds
Cliff Quay ...	E	1	45	M.V.	—	—	—	Aiton
Croydon B ...	SE	—	—	—	2	320	Simon Carves	Aiton
Deptford E ...	L	—	—	—	1	250	Foster Wheeler	John Thompson
Huncoat* ...	NW	2	30	G.E.C.	2	305	Simon Carves	Parsons
Keadby	Y	2	60	Parsons	1	550	Stirling	Parsons
Littlebrook C* ...	SE	1	60	Parsons	2	360	International Combust.	Parsons
Nechells B ...	M	1	52·5	Parsons	3	230	International Combust.	Stewarts & Lloyds
Northampton ...	EM	1	30	Parsons	2	190	Simon Carves	Stewarts & Lloyds
North Tees C ...	NE	2	60	Parsons	2	360	Babcock & Wilcox	Babcock & Wilcox
Plymouth B ...	SW	2	31·5	M.V.	2	320	Yarrow	Babcock & Wilcox
Poole	S	1	50	Parsons	2	300	International Combust.	Aiton
Portsmouth ...	S	1	30	B.T.H.	2	180	Mitchell	Parsons
Rotherham ...	Y	—	—	—	1	200	International Combust.	Stewarts & Lloyds
Rye House* ...	E	1	32	R.W.-P.	1	350	Babcock & Wilcox	Stewarts & Lloyds
Skelton Grange ...	Y	1	60	Parsons	2	360	International Combust.	Aiton
Staythorpe ...	EM	1	60	B.T.H.	3	240	Babcock & Wilcox	Aiton
Thornhill ...	Y	1	45	E.E.	1	180	Mitchell	Stewarts & Lloyds
Uskmouth A* ...	SW	1	60	G.E.C.	2	360	Babcock & Wilcox	Aiton
Warrington ...	MNW	1	30	Brush	1	200	Simon Carves	Parsons
West Ham B ...	L	2	30	E.E.	3	180	John Thompson	Aiton
Westwood ...	NW	1	30	B.T.H.	2	300	Babcock & Wilcox	Stewarts & Lloyds
Woolwich ...	L	1	30	G.E.C.	2	180	John Thompson	Parsons

*New station in 1952

Steam Stations in America

Present-day Design Trends Reviewed

AMERICAN electricity supply companies are at present building generating plant at a rate of some 10,000 MW every year. Some 90% of this is in steam stations; the remainder makes use of the still abundant water power of the U.S.A. In the designs used for the steam side of the programme many interesting ideas are being applied, some of them much the same as those apparent in recent stations on this side of the Atlantic, others illustrating a different approach to a common problem. Outstanding trends have been reviewed in recent months by our U.S. contemporary, "Electrical World."

Unit System

One of the similarities is the unit boiler-turbine arrangement. One of the main advantages stressed for this is the elimination of the need for switching at generator voltage. The switchgear duty for this task was becoming increasingly difficult to meet as generators increased in size. There is also a corresponding move towards higher steam temperatures and pressures, with 1,050° F, 2,000 lb/sq in. the present peak, though stations are being built for 1,100 F°, 2,350 lb/sq in. Limitations imposed by materials at these high temperatures are causing increased attention to be given to the reheat cycle, which is claimed to give an increase in efficiency corresponding to that to be gained from a 175-degree rise in the initial steam temperatures.

Improvements in boilers have kept pace with the demand for larger units, and pulverised fuel fired units now have an efficiency approaching 91% in the best cases. Close control of temperatures is necessary at the levels now common, and methods have been evolved which give this down to 60% of full load.

In the turbine field it is now possible to build tandem sets, running at 3,600 r.p.m. (for the American 60 c/s supply) in sizes up to 150 MW rating with double flow, and 250 MW with triple flow low pressure cylinders. At 1,800 r.p.m., still larger machines can be built on one shaft. In the largest capacities, however, it seems probable that the most economical arrangement is a cross-compounded set, with a 3,600 r.p.m. h.p. and a 1,800 r.p.m. l.p. units.

For reheat cycles, turbines have been developed in two main types. The simpler is a cross compound unit, with the h.p. machine exhausting to the reheater at a pressure of about 400 lb/sq in. In other installations, tandem compound 3,600 r.p.m. machines have been used with steam flowing in opposite directions before and after its passage through the reheater. This permits the location of all parts subjected to high temperature steam in a small zone near the mid-point of the turbine.

Generators

Alternators have grown in size alongside the turbines, an important factor being the extensive development of hydrogen cooling. Ratings as high as 220 MVA when operating with hydrogen at 30 lb/sq in. were included in the 1952 programme. Still larger generators are possible, but the economic limits of size for a single shaft machine are as yet uncertain.

One trend that has resolved itself recently concerns the rating of turbo-alternators: turbines are being rated at their maximum guaranteed output, and the associated generators are being given a corresponding rating at 0·85 power factor. Previously the general custom was to give the alternator an MVA rating for ½ lb hydrogen pressure equal to the turbine rating in MW.

Increased alternator size is making for a departure from the standard of 13·8 kV as a generator voltage. Now that there are few large machines supplying loads at generator voltage, this design limitation has been removed. 13·8 kV appears to be suitable up to about 115 MVA: above this rating freedom in choice of generator voltage may offer design advantages. A result of extending systems is a tendency to reduce short-circuit ratings, which under present preferred standards are specified as 0·8.

Exciters

For the largest 3,600 r.p.m. machines, either geared or separately motor driven exciters are in use. The motor-driven machines have a high torque induction motor with added inertia to maintain set speed during system disturbances, when voltages may fall sharply. Rapid recovery of normal speed is assisted by the high torque characteristic. Electronic exciters are also being found very reliable. Valve life

is about five years, and as they are operated in parallel, valves that have failed can be replaced while the exciter is alive.

No common practice exists in relation to the provision of spare exciters, and these are often not installed. Where spare motor-driven exciters are available, however, they are sometimes used to preheat the generator field before the set is started up.

Common practice has been to use 250 V for the field circuit of the alternator, but it is considered that for machines rated at above 100 MVA a higher voltage—375 V has been suggested—should be adopted in order to reduce the field winding copper and to ease the duty on the exciter commutator. For automatic voltage regulation, some installations now use a rotating amplifier acting in the field of the main exciter, instead of a pilot exciter.

Main Connections

A definite trend is stated towards the use of phase-isolated metal-clad busbar connections between the alternator and its step-up transformer. Suitable equipment is available on a factory assembled basis, and provision can readily be made for the take-off for the unit transformer, the p.t.s, and any surge protective equipment in use. The merits claimed over a cable run are increased reliability and low maintenance requirements.

Main transformers should be rated to take full advantage of the generator output after allowing for auxiliary loads, and 93% of the 15 lb/sq in. hydrogen rating of the alternator is recommended. With the high reputation for reliability of modern power transformers, present practice is to use 3-phase units, even though in some cases of large units, two 3-phase transformers have had to be used operating in parallel, and connected to the transmission system through a single circuit-breaker.

Four $2\frac{1}{2}\%$ taps are normally provided on the power transformers, giving a $\pm 5\%$ range. However, as alternators are planned for operation at rated MVA for a $\pm 5\%$ change in voltage, step-up transformers are in many cases being purchased without tap-changing gear. In general, generator transformers are simple two winding step-up units, delta/star connected. Third harmonic voltages produced by the generators thus do not appear on the transmission system.

Generator earthing may be carried out through a neutral reactor or resistance to keep fault current down. Another method of earthing utilises a distribution type transformer and a secondary resistance.

With the total auxiliary power requirement for a boiler-turbo-alternator unit varying between 5 and 8% of the kilowatt output, some single units will require 15 MW. With the motors concerned having a liberal rating, the power factor of the auxiliaries demand is usually about 0·7, which has a marked effect on necessary transformer ratings.

Auxiliary Supplies

Some three-quarters of recent American generators have a unit transformer directly connected to the main generator for auxiliaries; a further one-fifth obtain power from the generator busbar. Power for starting a unit and for general station service is commonly obtained from the transmission system.

Large turbo-alternators have their auxiliaries supplied at 4·16 kV, with 2·4 kV for medium ratings. Radial supply systems are commonly used, with simple interconnection facilities at switchboards. Loss of one side of the duplicate supplies, and thus of one-half of the auxiliaries, still permits the unit to generate at two-thirds of maximum output. As the use of 4·16 kV motors extends, there is a move towards operating the auxiliaries system earthed, with reliance on clearing faults quickly rather than on continuing to operate the system with a sustained earth.

Motors driving auxiliaries are to an increasing extent being provided with anti-friction bearings, though those coupled to essential auxiliaries usually retain sleeve bearings. In general, 250 h.p. is the lower limit for operation at 4·16 kV, and 200 h.p. for 2·3 kV. This approach is influenced by the need to provide sufficient mechanical rigidity in the motor and windings for adequate bracing, so that repeated starting at full voltage can be withstood.

Outdoor Stations

One final feature of American stations which has recently increased in prominence is the siting of equipment outdoors to reduce the amount of building necessary. Turbo-alternators in such situations are provided with a walk-in enclosure over the steam end to protect valve gear, etc., another over the barring gear, and a third over the exciter. For the majority of situations, modified base-ventilated motors are satisfactory. Auxiliary power switchgear at high voltage, though it can be mounted in the open, is found to be more economically sited indoors. Similarly some enclosure is necessary for control panels, l.v. switchgear and excitation cubicles. The cost of providing such enclosures even when they are not essential is often less than that of using specially protected gear.

NOTES ON WIRING *by Megohm*

Wiring Systems in Order

FROM enquiries made it appears that from wood casings, cleat wiring, compo and steel tubes and light gauge conduit systems prior to and from 1900 onwards, the next main development in wiring was the introduction of flexible wiring systems between 1905 and 1909 consisting of :—(1) Circular rubber insulated wire armoured cables. (2) Circular rubber insulated lead covered cables. (3) Stannos v.r.i. cables with circular tinned copper sheaths.

In 1911, flat v.r.i. lead sheath cables and earth concentric lead sheathed cables were introduced and in 1916 c.t.s. cables were marketed which were in 1926 renamed t.r.s. cables. In 1920 the looping screwed conduit system was first used in London and spacer bar saddles were patented. In 1933 I.C.I. marketed the Broduit light gauge copper conduit system and in 1937 m.i.c.s. cables were introduced into this country.

Post War

From 1937 to 1941 due to the international situation little development on new installation practice was possible but, due to the scarcity of steel and rubber, 1942 saw the introduction of :—(1) Aluminium conduits and accessories. (2) P.V.C. insulated cables, and (3) insulated fibre composition conduits. and at the conclusion of hostilities, p.v.c. insulated and sheathed multicore cables and polythene insulated and p.v.c. sheathed cables.

In 1948 and 1949, Grid Suspension and v.r.i. aluminium sheath cables were introduced and from 1950 up to date the following systems became available :—

Ductube—A system of, ducts formed by pneumatic tubes laid in the floor fill and withdrawn when the concrete is set.

Gilflex—A system of flexible composition insulated tubing installed in a similar manner to steel conduits.

Egatube—A system of non-flexible insulated tubing that can be bent, threaded and also installed in a similar manner to steel conduits.

Kopex—A system of flexible tubing comprising metal alloy strip wound on paper and connected to standard B.S. conduit boxes by screwed coupling adaptors.

These four systems provide for drawing in p.v.c. and/or v.r.i. cables and the method of wiring follows the general lines of wiring a steel conduit draw-in system.

Some 40 different systems of wiring have been in use since 1900, a number of these being different types of non-screwed steel conduit systems. The best and most economic circuit wiring systems in use today are generally considered to be those given in the table.

Where conduit systems are required, heavy gauge screwed welded black enamelled and/or galvanised conduits should be used and so arranged that the wiring can be drawn in and withdrawn easily without disturbance to the building structure.

Type of Buildings	Wiring Systems
Residential premises.	V.R.I. or polythene insulated p.v.c. or t.r.s. sheathed cable systems.
Stores, cinemas, theatres flats. Commercial and public buildings.	V.R.I. cables drawn into conduits or under-floor ducts.
Factories, warehouses, docks, aircraft sheds, railway stations, sports arenas, etc.	Grid suspension system and/or v.r.i. cables drawn into conduits.
Power stations and research laboratories.	V.R.I. or c.i. cables drawn into conduits and/or m.i.c.s. cable system.
Farm buildings.	V.R.I. or polythene insulated p.v.c. and t.r.s. sheathed cables with overhead distribution by grid suspension system.

I hope Mr. Geo. W. O. Ruscoe of the Midland Electricity Board will be pleased to see that the rubber insulated cables detailed above are described as v.r.i. cables and not v.i.r. cables. Views on the point whether rubber insulated cables should be described as (a) vulcanised insulated rubber cables, (b) vulcanised india rubber cables, or (c) vulcanised rubber insulated cables may be of interest to the cable makers who described their rubber insulated cables as v.i.r. cables in the ELECTRICAL TIMES on December 11, 1952, the date Mr. Ruscoe's letter was published.

Power from Pasir Panjang

FIRST 25 MW SET GOES ON COMMERCIAL LOAD IN SINGAPORE'S LATEST STATION

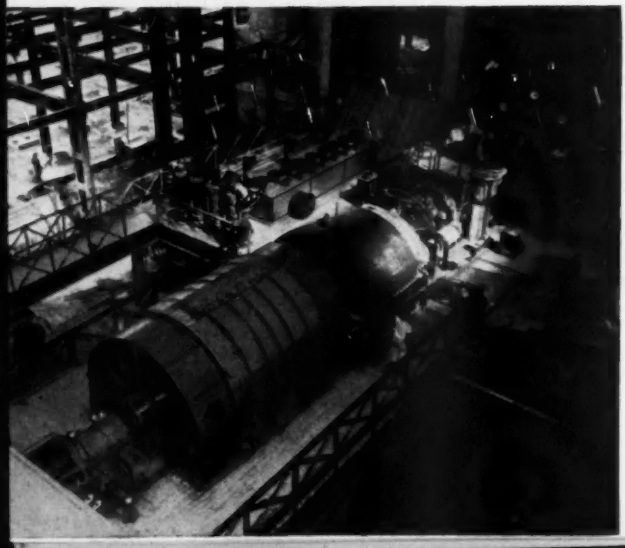
AT the beginning of 1949 permission was granted to proceed with the building of a new power station—Pasir Panjang—by the City Electricity Department, Singapore. Originally, it had been decided to extend the existing St. James's station, but a review of growth of load on the island showed that it would be necessary to provide at least 150 MW. Accordingly it was decided to build a new plant, and existing orders which had been placed for the St. James's station extension were diverted to the new power station, which is located some two and a half miles from the old power station. Ultimately, the station will comprise six turbo-alternators and nine boilers. Of these one turbo-alternator is now running, together with one of the boiler units.

A general view of the power station as it is at present. This view shows the boiler house side of the station

Boiler Plant

The boilers, made by Babcock and Wilcox, are each designed for an output of 187·5 klb/hr, and are all designed primarily for oil firing using steam atomisation. Four units, however, are being built to be able to use coal as well, the firing in these cases being by the well-known "Rotograte" stoker system. Full boiler auxiliaries are provided, including economisers, air preheaters, induced and forced draught fans, and high efficiency dust extraction units are located between the economiser gas outlets and the gas inlet to the air preheater.

When operating with oil, the steam conditions at the superheater outlet are 625 lb/sq in. at 825° F., but should coal firing be introduced the superheat can be raised to 840° F. In the dual-purpose boilers, the oil burners have been positioned on the front wall of the furnace, well above the spreader stokers. Estimated fuel characteristics for these units are: coal, 9,000 B.Th.U. per lb with 35% volatile, 20% moisture and 10-12% ash; fuel oil is expected to have a calorific value of not less than 18,500 B.Th.U./lb with 2-3·5% sulphur.



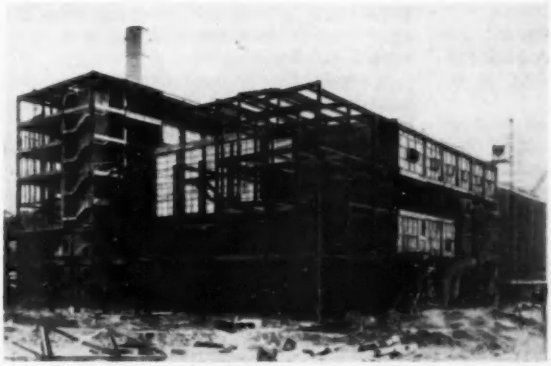
The first turbo-alternator to go into operation

Turbo-alternators

The turbo-alternators, made by Metropolitan-Vickers, are of

Here is the construction site as it appeared at the end of 1951

the two-cylinder tandem design with the alternator generating at 22 kV. The rating of 25 MW is for 0·8 p.f. The reason for the selection of 22 kV as a generating voltage is simply that the Singapore municipal system already has a 22 kV network of power cables and overhead lines, which is connected through transformers to the original main 6·6 kV system to which the existing alternators at St James's stations are connected As the system develops it will become necessary to superimpose a 66 kV network to reinforce both the 22 and the 6·6 kV systems to facilitate the transmission of power from the new station, and to provide interconnection with other projected stations.



The temporary cladding required as protection against severe rainfall is well shown in this illustration

For the time being, the new Pasir Panjang station and the existing station will be interconnected through two 22 kV underground cables and 12·5 MVA, 22/6·6 kV transformers made by the British Electric Transformer Co., of Hayes, Middlesex. These transformers are fitted with on-load tap-changing gear, both in-phase and for quadrature boost, to allow for complete control of power interchange between the stations.

Owing to the increased power capacity available, the existing 250 MVA metal-clad switchgear, which controls the 22 and 6·6 kV systems, will need reinforcement, and outdoor switchgear will be installed to control the higher voltage systems.

In addition to the main station plant a gas turbo-alternator is on order from C. A. Parsons and Co. This has a nominal rating of 1·5 MW, but may run up to 2 MW if site conditions prove favourable. The reason for the down-grading of this machine from its temperate rating of 2·5 MW is, of course, due to the high ambient temperatures prevalent in the region.

The accompanying photographs, kindly supplied by Mr. C. C. Payne, municipal electrical engineer, show the progress made in the building of this plant. The first set went into operation on December 9, 1952, less than two years from the date (January, 1951) on which the first contractors moved on to the site. It is hoped to have the second boiler in commission before February, 1953, and the second machine should be running no later than May.

It is perhaps of interest to note that at St. James's station the situation immediately following the war was so acute that it became necessary to install secondhand plant from this country. One of the items purchased was a 5,000 kW G.E.C. set, built originally by G.E.C. for the British Empire Exhibition of 1924 and subsequently installed at Keighley power station. This is now running under the more onerous conditions at Singapore, and giving full rated output.

Our thanks are due to Messrs. Preece Cardew and Rider, consulting engineers, and to Mr. C. C. Payne, City Electrical Engineer of the Singapore Electricity Department, for the information and photographs in this article.

Mechanised Servicing of Electronic Valves

A NEW store and service department has recently started operation at the Brimsdown factory of the Edison Swan Electric Co. This store uses to a remarkable extent mechanised handling, mainly by means of conveyor systems. From the factory, all tubes and valves are sent to the store on a main conveyor, and are transferred to their storage bays by means of special portable-type conveyors, linked to the main track.

The store itself comprises approximately three-quarters of the total floor area of 32,000 sq ft and is divided into sub-sections, each of which is numbered. A stock control index in the storekeeper's office gives running totals of the quantity and indicates the location of each item stored.

Five "cell" loading bays for vans are fed from a conveyor extending the whole length of the store, and this system can take in or dispatch from any loading bay.

The service department has been planned on "flow production" lines to reduce delays to a minimum, and it is hoped that within a very short time all valves returned under guarantee will be cleared within twenty-four hours.

The system adopted is that all packages are opened by a team of girls, who place the alleged faulty valves and the accompanying BVA forms and correspondence in specially designed trays. These are placed on a roller conveyor and proceed to typists seated on either side of the conveyor. The typist fills in a quintuple form set and gives details of the valves received, etc., and spaces are left to be filled in after test. These forms are attached to the BVA form and the valves and forms progress to the test department. They are first tested for "shorts" or "disconnects," and if the operator cannot find a fault are then further tested for emission and other general characteristics. If still no fault is found they receive a full range of "factory specification" tests, and if even then they appear sound they are tried out in a special bank of receiver chassis.

A similar type of procedure is adopted for cathode-ray tubes returned as faulty either from dealers or from set-makers. As and when a new tube is installed, the customer completes a card which can be referred to if the tube is returned. This gives details of the dealer, the guarantee, installation date, etc.

In this picture the conveyor system can be traced from the typists in the foreground to the testing department at the rear. In the upper picture the operator is testing a valve on a special "rectifier" test panel

PROBLEMS AND PRACTICE in Engineering

Insulation Testing—Plus

TESTING the insulation-resistance of apparatus and installations to ensure efficiency and safety is one of the accepted necessities in everyday electrical practice. Minimum standards are laid down in British Standards and in the I.E.E. Regulations for the Electrical Equipment of Buildings.

In carrying out the tests, and then in considering the results, an experienced inspector is guided by a number of factors—knowledge of the maker's or installer's usual work, the quality or grade of the material, the age of the "job," the conditions under which it has been installed and/or used, thorough physical inspection, and so forth. As was said of one man known to the writer: "He's got a 'nose' as well as a 'Megger'"—the "nose," of course, being a euphemism for his highly-developed fault-sense.

A particular need in the work is not to be misled by good "all-in" results. One valuable knack is the constant comparing of one circuit with another and one line with an adjacent line. A few wiring examples met by the writer illustrate the unexpected discoveries following non-acceptance of moderate but not bad insulation-resistance test-results. They will not, of course, surprise many "old stager" and other readers.

(1) Part of one 240 V circuit from a distribution-fuse board (a circuit apparently similar to others) was "down" somewhat—this was due to an irregular extension consisting of bell-wire! (2) A spate of "lowish" tests in a minority of new installations having T.R.S. cables buried in the wall-plaster was traced to nails driven through the cable—the offender a particular joiner who "couldn't care less," although all runs had been marked. (3) The phase side of a fairly new two-wire installation was much "lower" than the neutral side, with signs of occasional "dead earthing"—by a process of elimination this was traced to the phase wire behind a fitting crossing an earth wire under pressure; had the whole installation not been examined the earth-continuity system (which was found "dissed" from earth) might one day have become and remained "alive." (4) Circuit after circuit, in house after house, of V.R.I. cables in light-gauge conduit which should have given values towards "infinity" were poor, and the pulling-out of trial leads showed that many runs such as switch-drops had been cut too short and were lengthened with dry twisted joints insulated with sticky tape—a mound of several score such joints eventually forming the monument to a cut-price contractor.—*G. E. M.*

Inter-circuit Connections

IN trying to isolate an old lighting circuit for the purpose of fitting a new switch it was found that the light went out when the neutral fuse was removed but came on again at the withdrawing of the line fuse. Inside the fuse board was a mass of wires and we had a job to trace the fault.

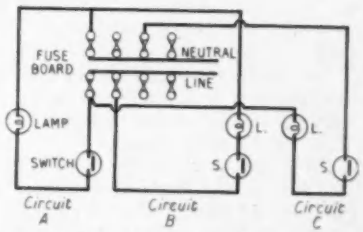


Diagram of the inter-connected circuits showing how the three linked up on removing the fuses for circuit "A"

You will see from the diagram that the affected circuit "A" was getting a line on the neutral side from circuit "B" and a neutral on the line side from circuit "C."—*R. T. Wallace.*

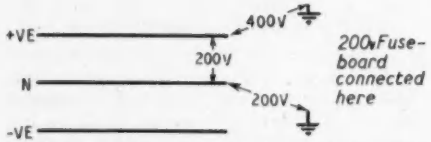
Earth Free Neutral

AFTER a recent change over from a factory d.c. power house which had become obsolete due to a change over to a new power house generating a.c., the following fault occurred. Most of the load had been changed over to a.c., but a certain load which included 400 V and 200 V, d.c. motors still remained in use and had to be fed from the factory's rotary convertor. The necessary cable alterations were made and the d.c. power house was shut down.

The next day I was checking a 200 V d.c. fuseboard using a 400 V test lamp (two 15 W lamps in series) and the results I obtained are as shown in the diagram, i.e. :—

n to earth—200 V (½ light on lamps)
+ve to n —200 V (½ light on lamps)
+ve to earth—400 V (full light on lamps)

These readings made me think and on checking back to where the supply entered the building, the same fault persisted. It was rather a long walk to where the rotary convertor was installed and when I arrived there and checked, the fault had disappeared. Going back and checking the fuseboard and supply again, I found the fault had also disappeared there. On ringing up the shift engineer, I was told that he had found that the earthing resistance in the old power house had been switched out when the



Voltages measured at the fuseboard due to the earthing resistance

change over had occurred, and that this resistance had been getting rather warm. This explained the fault and why it had cleared itself. He had found the switch open while I was checking back to the rotary convertor and had switched in the earthing resistance again thus restoring the proper supply.

With the rotary convertor being an all-insulated system, and the earth resistance out of the circuit, the neutral was not common to earth, hence the freak results. Also had I not been using a 400V test lamp I should have had one more surprise.—*S. L.*

Grease at High Speed

GREASES for high-speed motors have probably been given more attention of recent years than at any time heretofore, in view of the economies gained alike in the avoidance of premature wear and the transmission of power. It is, however, no easy matter to systematically determine what particular grease will satisfactorily lubricate the ball and roller bearings under a wide range of operating conditions.

In one example, where running was carried out for 18 days in a test motor, the ball-bearing grease had a dropping point of 167°C and a worked consistency, as shown by the penetrometer, of 308. During four of these days the temperature of the grease was 80° C in the bearing at the pulley-end, and 70° C at the front-end.

The grease attained a semi-fluid condition at the end of this period, and not a little of it leaked out into the windings along the shaft on the pulley-end, while the grease left in the bearings was plastered around the balls, and was very soft. The conclusion reached was that this grease was unsuitable, as it thinned down too much under the temperature which prevailed. In another example, the running was done in the motor at room temperature, with a ball-bearing grease with a dropping point of 135° C, and worked consistency of 318, and as most greases will do under such conditions, it performed satisfactorily. The actual running temperature was increased to 80° C and maintained at this degree for several hours, when the bearing temperature suddenly rose to 140° C and remained at this figure for two hours, when the test was stopped.

Although the grease did not actually leak out, it remained very soft in the bearing housings, which was repeated when the test was performed a second time. In other words, the grease could not withstand 80° C without breaking down.

In a further example, a ball-bearing grease with a dropping point of 230° C and a worked consistency of 274 was run for three weeks, one of which was at 100° C and the other two at 90° C. The grease at the end of that time appeared to be operating very satisfactorily and in excellent condition. Although it was normally very stiff when the motor was cooled to room temperature, the consistency under operating temperatures was very reliable, while a thin film of grease was shown by the bearing surfaces, and it was accepted as the most promising of those tried out.

The above examples show it is thus possible to predict within reasonable accuracy whether the particular grease selected will give the required service by testing it in a large bearing operating at high speed over a wide range of temperatures, and observing its condition at the end of the run. For such functional tests one type of motor recommended is a 30 h.p. standard induction model, possessing ball bearings at one end and roller bearings at the other, both of which are about 5 in. in diameter. This need not be loaded, but for the pressure relief system should have pressure grease fittings. The equivalent of a year or more of service is ascertained by a 500-hour test on this class of motor. One arrangement of test conditions is that the required life of the bearings before failure should be some 10% of the service life which could be expected of the bearing in the normal way.—*A. G. Arend.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Problems of a practical nature to which a solution is required will also be considered. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

Measuring Insulation

METHODS FOR CHECKING INSULATORS WITH D.C. AND A.C.

OF all the measurements necessary to the electrical engineer, that of insulation resistance is probably the most important. For this reason, the lecture, given by Dr. J. S. Forrest to the E.P.E.A. last Monday night, while adding little to present knowledge, was of particular interest due to its comprehensive coverage of the methods adopted today. He began by pointing out that an insulator was a substance in which the work function was large enough to prevent electrons from metal electrodes applied to it, from entering the substance even under the influence of very strong fields. A further necessity was that the insulator should contain electron "traps" to prevent any electrons which did enter from moving freely through the material. An insulator could be represented by a circuit consisting of two parallel links, one being a resistance (R_p) and the other a resistance (R_s) in series with a capacitor (C_x). The measurement of insulation then became a question of measuring some or all of the elements in the circuit. Thus a steady voltage could be applied and R_p measured, or a voltage could be applied suddenly and the change of current with time noted to give information about the capacitance C_x, the loss resistance R_s and the leakage R_p. By applying an alternating voltage of various frequencies it was possible to obtain the impedance and power factor, and to deduce the three parameters. A high voltage could be used to find out the breakdown voltage of C_x and surface breakdown characteristics such as tracking. Finally it was possible to measure the inception of discharges by methods which detected corona or high-frequency.

D.C. Measurements

One of the simplest methods of measuring insulation resistance was the direct method by comparison with a known resistance, or the calculation of resistance from the applied voltage and the leakage current. This principle was employed in the "megohmeters" employed in many multi-range instruments. There were however, many pitfalls to be guarded against when measuring high resistances. In the first place it was necessary to eliminate surface leakage from the measuring circuit, a function which could be carried out by guard electrodes. Second, dielectric absorption could occur, and it was then necessary to take measurements after a definite time of electrification—usually a minute. Third, insulation resistance might vary with the applied voltage and finally it should be remembered that resistance changed rapidly with temperature.

An indirect, but convenient and well-known method of measuring very high resistances was by connecting the unknown across a low-leakage condenser of known capacity and by measuring the time taken for the initial voltage to fall to a predetermined value.

The crossed coil ohmmeter was invented by Professor Ayrton in 1882. In principle this instrument consisted of a voltage and a current coil fixed at right angles with a magnetic needle pivoted at the centre of the coils. As the needle deflection was a function of the ratio of the currents in the coils it provided a measurement of resistance. The liability to maloperation by stray fields was overcome by the introduction of a fixed permanent magnet with the cross coil system located in its field. Evershed, in 1904 conceived the idea of using a common magnet system for the field of the hand generator which provided the test voltage, and the instrument now known as the "Megger" Insulation Resistance Test Set made its appearance. Subsequent developments have made modern designs capable of measuring insulation resistances of up to 50,000 megohms at 2,500 V.

Electronic Methods

The great advantage of the electronic techniques now introduced, was, that due to the high impedence of the input circuit, the sensitivity of the instrument could be increased without a loss of robustness in the instrument. For example, using the condenser method with valve voltmeter it was possible to measure resistances of 100,000 megohms, and 20 million megohms had been claimed. Furthermore it was easy to incorporate a high voltage d.c. source of test voltage with a range of values. Such instruments using a "magic eye" indicator and with test voltages derived from a high frequency power unit could be made remarkably compact, and instruments of this nature had been responsible for a great exten-

sion in the range of field testing. Not so long ago, resistances of more than 100 megohms had been regarded as infinity. Now 5,000 megohms was considered a suspiciously low value for an insulator on a 132 kV system.

When dealing with these high values, care should be taken that the relative humidity was if possible less than 70%, and the observed reading should be converted to a value at a standard temperature. Formulae and nomograms were available for this purpose.

Electronic sets were also convenient for dielectric absorption methods, as steady test voltages were available for as long as required.

A.C. Measurement

The simplest kind of a.c. measurement consisted of applying an alternating voltage of the required frequency and measuring the current through the insulator. This gave the impedance of the insulator, which was a function both of the capacitance and the leakage. When the capacity was small the leakage current predominated and might give a useful measure of the characteristics of the insulation. This method had been valuable in the study of performance of overhead line insulation operating in damp and dirty situations. Another useful measurement was that of the voltage gradient along the insulator. If the leakage resistance of a particular section were low, the voltage drop would be correspondingly reduced. Such voltage measurements had to be made with a high impedance meter such as an electrostatic instrument or a valve voltmeter. This attack had proved useful in locating faulty overhead line and bushing insulators in the field.

For power factor measurements, the Schering bridge was commonly used. This worked over the frequency range of from 50 c/s up to 10 kc/s. At power frequencies a vibration galvanometer was used as a detector. At higher frequencies, however, a valve amplifier detector with or without a filter circuit was necessary. Power factors down to about 0·0001 could be measured with the Schering bridge at voltages up to the maximum which the standard condenser would withstand.

Although the Schering bridge was a flexible and accurate method of measuring power factor and capacitance, in some applications it is convenient to measure the power loss in the insulator by means of a sensitive wattmeter. Such an instrument had been used to measure bushing power factors at 10 kV in high-voltage substations. Double screening was necessary to reduce errors due to induction from neighbouring high-voltage connections. A useful expedient in such cases was to take two readings, one with the polarity of the test set supply reversed. The mean of these two readings then gave the true value (W) of the power loss. The power factor was then given by W/EI. Wattmeters for such measurements gave full scale deflection with 0·02 watts at the terminals and were capable of measuring power factors down to 0·002 at 10 kV.

Resonance Methods

For radio frequency measurements resonance methods were often used. One method depended on the fact that in a tuned circuit *at resonance* the current in the circuit (or the voltage across the circuit) was determined by the losses in accordance with the simple relation $I = E/R_s$, where R_s was the equivalent series loss resistance. Thus by inserting known resistances in the circuit it was possible to determine from current measurements only, the inherent loss in the apparatus, and then, by difference the losses in the insulator or the insulating material under test. The capacitance in the circuit could be measured by substitution or other methods.

In an alternative system, the voltage across a parallel resonance circuit was measured by a square law thermionic voltmeter, and the capacitance change noted to reduce the maximum reading at resonance to half of the maximum deflection on each side of the resonance curve. By substituting the insulator under test in place of the parallel circuit and comparing the values obtained in the two cases it was possible to derive values of the conductance of the insulator.

Modern developments in this type of instrument have made it possible to go up to 500 Mc/s. Dr. Forrest also commented on the measurement of dielectric strength, tracking and discharges.

Impulse Measurements

There was an increasing trend toward specifying impulse testing. High voltages were needed to test insulating components on transmission systems. For example, 640 kV was a standard test value for 132 kV insulation. The Marx generator was almost universally employed for this work. Readings of wave shape, peak voltage and time-to-breakdown, being taken on a high-speed cathode ray oscillograph through appropriate potential dividers. The difficulty was to obtain an accurate reproduction of the applied wave. A modern sealed off cathode ray tube would fulfil most requirements and it was usually advisable to take a photograph of the applied impulse to gain evidence of any unexpected phenomenon.

CHALK CRUSHING

A New Installation at Chinnor

A NEW crushing and screening plant, designed and manufactured by the Fraser and Chalmers Engineering Works of the General Electric Co., Ltd., is now operating at the quarries of the Chinnor Cement and Lime Co. The plant, capable of handling 70 tons of dry material per day, can take blocks up to 3 ft by 2 ft by 2 ft. At the plant the chalk is tipped into a steel receiving hopper from which it is fed into the crusher by means of a moving-bar grizzly feeder. This feeder, 4 ft wide by 15 ft long, removes the fines ahead of the crusher which fall to the belt conveyor below, and it is driven by a 7½ h.p. slipring motor having a variable speed of 480/725 r.p.m. The drive is transmitted through a vee rope drive.

Processing

Reduction is effected in a Fraser and Chalmers Pennsylvania single-roll crusher which can be adjusted to give a product as large as minus 9 in. or as small as minus 5 in. A roll speed of 35 r.p.m. is employed and the crusher is powered by a 65 h.p. slipring motor having a speed of 725 r.p.m., the drive being transmitted by vee ropes to the crusher counter-shaft which is geared to the main roll. This type of crusher is very suitable for reducing somewhat sticky material.

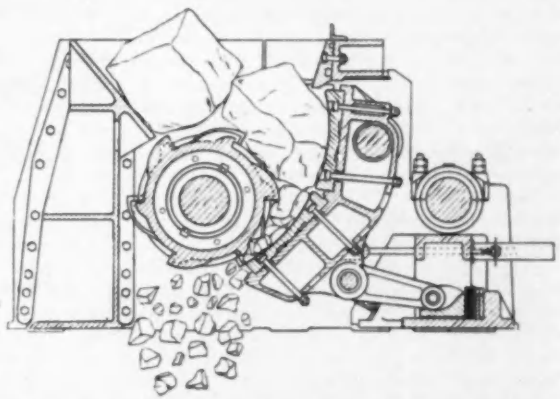
The product, together with the grizzly undersize, then passes along a Fraser and Chalmers 30 in. inclined belt conveyor, 156 ft centres, to the screening section. A 10 h.p. high-torque squirrel cage motor having a speed of 720 r.p.m. drives the conveyor through a worm reduction gear coupled to the head pulley shaft.

All material is discharged from the conveyor on to a Fraser and Chalmers Gyrex screen, 60 in. wide by 102 in. long, style C11, from which the oversize is fed into one hopper, while the undersize passes to another. A flapper valve is provided to enable the screen to be by-passed when necessary, all the material then going direct to the undersize hopper. The Gyrex screen is fitted with a 6 in. mesh which can be varied, to suit requirements. The screen undersize passes to the adjoining wash mill of the cement plant, while the oversize is discharged by means of a chain feeder into 1 cu. yd. Decauville wagons, from which it is transported to the lime kilns. The chain feeder has a width of 30 in. and is fitted with a variable speed reducing gear, driven by a 2 h.p. 720 r.p.m. motor. Frequently all the chalk is diverted to the cement plant, in which case, the screening operation is, as indicated above, omitted.

Discharge to the wash mill is regulated by means of a 30 in. dia. by 62 in. wide roll feeder driven from a 2½ h.p. slipring motor having a variable speed of 480/725 r.p.m., an auxiliary chute being provided so that all the material can, if required, be emptied into Decauville wagons through a radial gate, 36 in. radius by 30 in. wide.

A five-ton double-girder hand-operated travelling crane is fitted into the crusher house for servicing the crusher, feeder, etc. This has a span of 24 ft and runs on rails 25 ft above the floor level.

In addition a travelling block worm gear is fitted in the screen house capable of lifting two tons, built into a four-wheel trolley with gear for travelling on the lower flange of a steel joist. This is operated by chains from the floor.



This diagram shows the operation of the Pennsylvania single roll crusher

Local Lighting in the Mines

Recent Developments in Cap Lamps for Miners

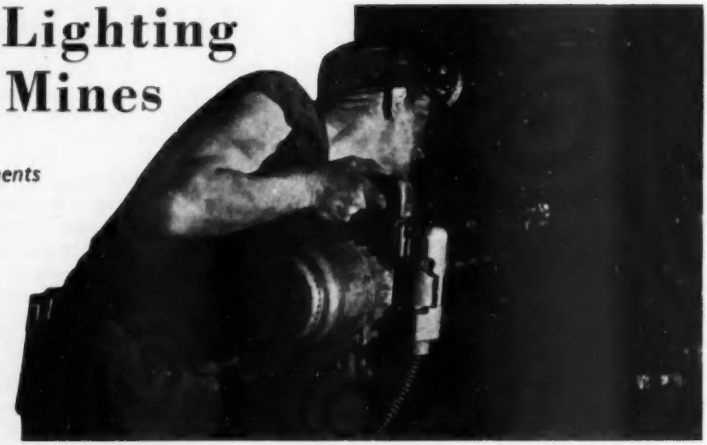


Photo: NCB

MECHANISATION of coal mines has introduced hazards which can only be overcome by the provision of more lighting. The technique of coal-mining, however, is such that freedom in space is restricted and permanent lighting installation, except for main roads, is difficult. The most general source of illumination for the miner, therefore, devolves on the cap or hand lamp. Some details of progress in this field are given in an article by Mr. D. A. Strachan in a recent issue of the *International Lighting Review*.

Historical

The past six years have seen much improvement, in this country, both in equipment and technique, although as far back as 1934 legislation had been introduced to improve lighting performance. The 1934 Regulations required that at the end of nine hours burning the mean spherical candlepower (m.s.c.p.) should not be less than 0·4 for cap lamps and 0·75 for all other types. In 1947 these figures were raised to 1·2 and 1·7 respectively, using krypton-filled bulbs. Technical advances which have made possible the improved lighting performance include the introduction of higher voltage and more efficient batteries, improved designs of cap reflectors and, of coursé, the development of krypton-filled bulbs.

There can be no doubt that the portable lamp of the future will be the cap lamp and, indeed, the use of hand-held lamps is rapidly declining. In 1943 the number of hand lamps in use was some 314,000; by 1950 this had fallen to just over 63,000. In the same period cap lamps rose from 140,000 to about 411,000.

At the present time, efficient cap lamps having either acid or alkaline batteries are available. A twin-cell acid battery is generally used to give a nominal voltage of 4, or a three-cell alkaline unit with a nominal voltage of 3·75.

A "self-service" or "self-issue" system of lamp-room operation has been developed, particularly where acid batteries are used, as then a "constant-potential" charging system can simply be adapted. With alkaline batteries, however, charging is carried out on a "constant current" system with many lamps in series. The responsibility for charging the latter, therefore, devolves on the lamp-room staff.

The design of cap lamps is based on the necessity to provide an effective and efficient distribution of light with the least possible inconvenience to the wearer. Anodised aluminium reflectors are in general use, with four types of finish: matt, semi-matt, semi-polished and polished. The majority of cap lamps use semi-matt reflectors, but with more mechanisation it is possible that a greater proportion of specular reflectors will come into use.

The Krypton Lamp

The most important recent development is the introduction of the krypton-filled bulb. These high-efficiency bulbs are now used in about 85% of miners' lamps compared with 3% in 1946. They have a laboratory life of about 200 hours and a pit life of 500/600 hours. Light output of the 18 mm dia. bulb is between 40 and 50 lumens, giving a light/weight ratio of about 4 lumens/lb for cap lamps. However, there are some indications that the cap lamp as we know it today may have reached near the upper limit of light output for its weight, and it may become necessary to attack the problem of establishing a satisfactory level of general illumination at the coal-face and elsewhere by means of mains lighting.

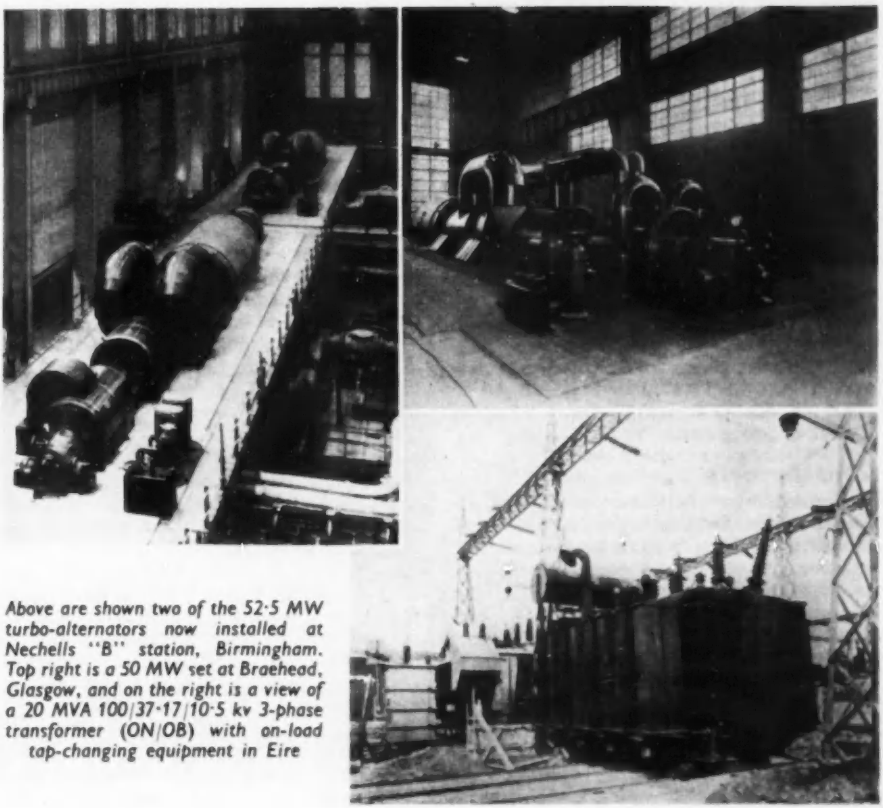
Orders and Output — 1952

C. A. PARSONS & CO. LTD.

THE orders received in 1952 were for machines varying in capacity from 5,000 kW up to 60,000 kW; they are required for power stations in this country, Canada, Australia, South Africa and Venezuela.

The 60,000 kW sets for this country include orders for further machines for the new power stations at Stella "North" and "South"; Dalmarnock power station, and the new station at Tilbury. The turbines will be of the three-cylinder standard type and the alternators will be hydrogen cooled. Further 60,000 kW sets have been ordered for the new power station at Taaibos, South Africa, but the alternators for these machines will be air cooled. Air cooling has been adopted because coal is much cheaper in South Africa than in this country, and the saving effected by the use of hydrogen would not justify the additional cost.

Amongst the smaller turbo-alternators are two industrial type machines. One of these is for an output of 6,000 kW; it is required for an iron works in this country, and the turbine will be designed for passing out steam after partial expansion. The other machine is for an output of 6,600 kW and is required for a pulp and paper mill in Newfoundland; this machine will be of the back-pressure type.



Above are shown two of the 52·5 MW turbo-alternators now installed at Nechells "B" station, Birmingham. Top right is a 50 MW set at Braehead, Glasgow, and on the right is a view of a 20 MVA 100/37·17/10·5 kv 3-phase transformer (ON/OB) with on-load tap-changing equipment in Eire

During the past twelve months a large number of turbo-alternators have been completed on site or put into commercial operation; these total over 1,100,000 kW. The larger machines include the second and third 100,000 kW sets in the Richard L. Hearn generating station, Canada, and in this country 60,000 kW sets at North Tees, Skelton Grange, Keadby and Littlebrook. Four 50,000 kW sets have also been completed; three in this country and the fourth in Holland. The smaller machines, ranging in output from 500 kW up to 30,000 kW, have been installed in this country and in Australia, Canada, South Africa, Belgium, Iraq and Venezuela.

Erection work on site is proceeding, or is due to commence, on further large machines recently completed and dispatched to power stations in this country and overseas.

Gas Turbines

Work is proceeding on the erection of the 15,000 kW gas turbine-alternator at Dunston power station, and on the 10,000 kW set for the National Gas Turbine Establishment at Farnborough. Smaller machines under construction are a standard 2,500 kW plant and a 2,000 kW plant for the Municipality of Singapore.

As a result of the successful tests undertaken last year by Messrs. Parsons on the burning of pulverised coal in their 500 h.p. experimental gas turbine plant, the Ministry of Fuel and Power, after consultations with the Railway Executive, British Railways, has ordered an open-cycle external-combustion, coal-burning gas turbine locomotive. Messrs. Parsons are making the gas turbine and the North British Locomotive Co. Ltd. the running gear. The locomotive, arranged with mechanical transmission, will be powered by a gas turbine of 1,800 h.p., giving a maximum horse-power at the rail of about 1,600.

Transformers

During the last twelve months an order has been received for the largest double-wound transformer ever to be made by this company. It is for a 120 MVA unit which is to be used to step up the generator voltage of the 100,000 kW turbo-alternator which is being made by Parsons for Ferrybridge power station, to the transmission voltage of 132 kV.

An order has also been received from the B.E.A. for a further three 120 MVA, three-phase, 50 c/s, 275/132 kV auto-transformers for use in the inter-connection between the new 275 kV system and the existing 132 kV network in this country. Tap change on-load equipment is to be provided to give a variation of plus and minus 15% in 18 steps in the 132 kV windings.

Orders for power and distribution transformers, for use in many different parts of the world, including Australia, Borneo, Curaçao, India, Malaya, Nigeria, Pakistan, South Africa, Trinidad and Venezuela, continue to be received.

From Australia are orders for one 20 MVA, 66/6·6 kV and two 40 MVA, 132/11 kV transformers, each being suitable for the fitting of on-load tap-changing equipment, and three 6 MVA, 22/6 kV and two 3 MVA, 11/3 kV units.

For India manufacture is in hand on 18 transformers having a total rating of 41·7 MVA, and for Pakistan, two 5·0 MVA, 33/6·9 kV units.

The expansion of the oil industry in Venezuela has resulted in orders being received for two 18·75 MVA generator transformers, four 25 MVA, 66/33 kV transmission transformers, which are to be fitted with on-load tap changing equipment, and three 1·0 MVA, 33/6·9 kV units.

The large number of orders for distribution transformers, and for transportable substations for use underground in collieries, continues to be maintained.

TELEPHONES AND TELEGRAPHS

PUBLIC and private telephone and telegraph services are the latest subjects to be dealt with in the Codes of Practice for Buildings series. The code discussing private services is issued as CP327.101, and describes the principal telephone and telegraph systems supplied and maintained by the British Post Office to provide intercommunication in and between buildings. In particular, the code gives details of the structural requirements that enable the apparatus to be located at the most advantageous points without undue difficulty.

The companion code, CP327.102, provides corresponding notes for systems other than those connected with the Post Office system, dealing with services ranging from a simple direct line between two instruments to the largest private exchange.

Both codes pay attention to necessary power supplies and to the need for segregation between telecommunications cables and those carrying power. There are appendices devoted to this latter subject, and this discusses the precautions necessary for avoiding risk both of interference from the power circuit and of high voltage.

Both Codes are published by the British Standards Institution, 24, Victoria Street, London S.W.1.

Queensland's Financial Difficulties

Shortage of Loan Funds Restricts Development

LACK of finance was the chief worry of the State Electricity Commission of Queensland during the year ended June 30 last, it would seem from the annual report just received. The shortage of loan funds has, in fact, added many years to the time that a large number of people must now wait before they get a supply of electricity. In the areas of the four Regional Boards (Cairns, Townsville, Capricornia and Wide Bay-Burnett) particularly, it was necessary to concentrate practically all financial resources on the completion of major generating facilities so that supply to existing consumers at least would be fully protected. The trading departments were thus seriously affected.

Restrictions

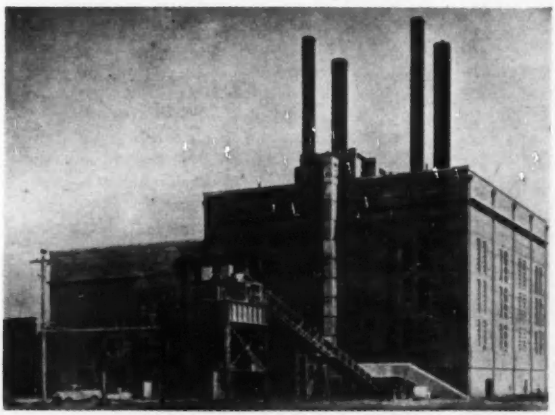
Although every effort was made to complete the construction of new power stations, despite many difficulties and disappointments with respect of promised deliveries of some essential equipment, it became necessary to introduce restrictions in South Eastern Queensland to reduce the peak demand. This, coupled with heavy expenditure on equipment which was not immediately revenue producing, explains why the balance at the end of June last was over £15,000 down on the previous year, despite an increase in tariffs. It is expected that the balance will be restored during the current year. The period under review saw a total of 44,477 kW of generating plant commissioned. The new power house at Rockhampton was opened on September 27 last with, initially, three 7,500 kW generators and six boilers, while the new station at Townsville is well advanced and should be ready within a couple of months.

New Plant

At the Howard power station, which was opened in September, 1951, with two 7,500 kW sets (it is to have an ultimate capacity of 52·5 MW), very satisfactory efficiencies have been attained. A third set is now being installed together with two more boilers. Also under construction are two 10,000 kW "packaged" generating sets, "purchased at fairly high cost to assist in meeting demands until the major stations can be commissioned." These are being erected by the City Electric Light Co. (shortly to be dissolved, as we noted on December 2) at Abermain, and by the Brisbane City Council at Tennyson. Apart from these, work is also progressing at the Tully Falls hydro-electric project, and on the City Electric Light Co.'s Bulimba "B" station, where it is hoped that the first 30 MW set will be operating by mid-1953. The present programme provides for the installation of eight sets at Bulimba "B" and the new Tennyson station by 1958. From that date onwards the programme must be quickly dealt with, based on a plan to deal with the whole of South East Queensland as a fully integrated system.

The year covered by the report also notes the completion of seven of ten schemes prepared by the Commission for providing supplies in small townships of between 250 and 1,000 people. The remaining three schemes are well advanced. These schemes, which have cost an average of about £25,000, carry a Treasury Department subsidy of 60-65%.

Finally, there is a reminder that numerous domestic appliances, from toasters to bed warmers must, as from January 1, 1953, conform to specifications of the Standards Association of Australia.



Rockhampton power station of the Capricornia Regional Board

BRITISH STANDARDS

Electric Cables for Aircraft (Glass and Polychloroprene Insulated). *B.S. E.*21: 1952. *Price* 3*s.* 6*d.* Replacing Ministry of Supply (Air) Specification E.L. 1470, this standard states the requirements for "Pren" type cables where the potential between conductors, or between conductor and metal braiding or aircraft structure does not exceed 250 V (R.M.S.) and 1,600 c/s. Although these cables do not support combustion they should not be regarded as complying with requirements in B.S. G.100.

Electric Fuses. *B.S.* 88:1952. *Price* 6*s.* This new revision, the fifth to appear, incorporates modifications which aim at helping users to understand all the implications of the standard. Thus it does not represent a full revision. However, still further improvement in the standard is being hoped for and the committees concerned will continue active work. One particularly useful addition to the standard is a new footnote taking additional account of the critical point of operation near minimum fusing current.

Commercial Platinum Resistance Thermometer Elements. *B.S.* 1904: 1952. *Price* 2*s.* 6*d.* This British Standard forms one of a series being prepared in relation to temperature measurement. It specifies requirements for temperature-sensitive resistance elements made of platinum foil, strip or wire, usually contained in a sheath forming a thermometer bulb, and used with suitable electrical indicators, recorders and/or controllers for a variety of industrial purposes. The standard includes tests for stability and behaviour under vibration.

British Standards reviewed above may be obtained at the prices stated from the B.S.I., 24 Victoria Street, S.W.1.

Installations in London Buildings

FROM the beginning of this year, new by-laws have applied to buildings erected in the Administrative County of London. Although these concern mainly civil engineers, builders and architects, there are certain clauses which affect electrical installations, particularly in connection with buildings over 100 ft in height or having sections of over 250,000 cu ft volume. Strictly, these are forbidden by the by-laws, but they are permitted in practice subject to certain conditions being observed.

The principal alteration to be noted concerns transformer chambers in such buildings. It has been the practice previously to allow a steel access panel for plant to be fitted in the wall of such a room, provided it was fixed shut with nuts and bolts, the normal access to the chamber being from the outside air. In cases where it is necessary for an emergency exit to deliver into the main building, this will now be permitted by a portion of the plant access being hinged and arranged to open. Triple action bolts must keep shut this door, which has to be flameproof, and to open into some portion of the building not used by the general public.

Of former conditions which are retained, if sometimes expressed in different words, a few of the more important may be noted. For instance, for buildings of excess height details of the electrical installations in the case of certain garages and car parks and of parts of buildings used for processes with special risks, must be submitted to the Council. Transformer chambers must not have a supply voltage of more than 33 kV, and the transformer capacity in any single compartment must not exceed 1·5 MVA.

Firemen's lifts are required, and the electricity supply to these must be controlled independently of that for the rest of the building. Cellulose spraying rooms have to be provided with flameproof or vapour-tight fittings, and to be wired in heavy-gauge screwed metal conduit. For celluloid storerooms it is required that lighting fittings should be of the protected type in which the lamp is totally enclosed, and that lighting switches and all non-essential electrical equipment should be outside such rooms.

Cubical Content

For the buildings of "additional cubical content," it is again required that the electrical installations be provided and maintained to the satisfaction of the Council in the case of certain garages, departmental stores, buildings for speculative letting, or those used for high fire risk purposes. In addition, electrical work for signs or lighting in or on the building and operating at more than medium voltage must be approved by the Council.

Finally, for basement and sub-basement garages, all control gear, including ventilating plant motors and switchgear, must be housed in an independent control room outside the garage unless it is flameproof.

New Street Lighting in Cambridge

One of the most comprehensive street-lighting schemes in this country is now being carried out at Cambridge. The main lighting on through and ring roads is of sodium vapour, while that in the city centre will probably be fluorescent. Our pictures show above, a roundabout (Newmarket Road) under the original gas and the new electric lighting. On the right is façade lighting (Bridge Street) using twin 80-W fluorescent tubes in special fittings. Below, left, is a view of East Road with sodium vapour, and bottom, right, is shown a method of utilising existing standards. The installation is by B.T.H. in co-operation with the Eastern Electricity Board and the City Corporation

overseas news

Extending Beauharnois

The Quebec Hydro-Electric Commission has purchased one of the most powerful dredges in the world in order to increase power generation at the Beauharnois plant on the St. Lawrence River. Cost of the new dredge is given at over $3 million. The Beauharnois station was taken over from the Beauharnois Light, Heat and Power Co. in 1944 and has since been the subject of discussion before an arbitration board to determine the compensation to be paid. The No. 1 generating plant has a capacity of 742,000 h.p., and the No. 2 plant, which is actually an extension of No. 1, has space for twelve 55,000 h.p. generators, which are all planned to be installed by the end of 1953. On the completion of this expansion the Beauharnois plant will have a total capacity of 1,402,000 h.p. and will be one of the largest hydro-electric schemes in the world.

Newfoundland Expansion

To provide for load growth on its system, Newfoundland Light and Power Co. has two hydro-electric plants under construction—one of 7,600 h.p. at Cape Broyle scheduled for completion this month, the other of 10,000 h.p. at Horse Chops which is expected to be finished next June. In addition, a 3,500 h.p. diesel plant at St. John's, which will provide some spare capacity and a reserve of energy in a low water year, is nearly completed.

Manufacturing Progress

While the gross value of all manufactured production was rising about four times between 1939 and 1951, the total for the electrical industry swelled seven and a half times, stated Mr. Herbert H. Rogge, president of the Canadian Westinghouse Co. Ltd., in an address before the Electric Club in Toronto last month. He noted also that the industry in 1951 had achieved an all-time record of $676 million despite a relatively poor showing in the first few months of the year, caused by taxation and credit restrictions. As evidence of the progress of the electrical industry he quoted the following comparisons: in 1939 electrical manufacturing plants employed 20,000 people; in 1951 the number was about 68,000 employees. In 1939 wages totalled $25 million and in 1951 wages amounted to $195 million.

New 230 kV Line

A new 230 kV line is being built from Glanford to the Petersburg transformer station near Kitchener at an estimated cost of $2,492,000 by the Hydro-Electric Power Commission of Ontario. A labour force of 125 men is working on the initial circuit of the double-circuit line which is to be completed by July next. On the 43-mile route there will be 223 towers. The conductor is to be s.c. aluminium with a diameter of 1·34 in.—the largest ever strung by the Commission, according to Mr. R. H. Saunders, the chairman. Giving these details, he said that with initial power expected from the Sir Adam Beck Niagara generating station No. 2 by 1954, new transmission line facilities to handle it are being pushed forward in Western Ontario. Power from the Sir Adam Beck unit will be fed into the 230 kV network, where it will be fed to the Allanburg transformer station, near Welland, the E. V. Buchanan station, London, the Petersburg station, Burlington transformer station, the A. W. Manby transformer station, Islington, and Essa transformer station, near Barrie.

Frequency Change-over

With more than 250,000 consumers changed over to 60-cycle power, the Hydro-Electric Power Commission of Ontario has undertaken the initial steps to change its generating stations to produce 60-cycle power instead of 25-cycle. First station to be affected will be the newest of the Commission's two plants at DeCew Falls, near St. Catharines. One of two units at that plant will be converted in 1954. The change is part of the project of bringing a large area of Southern Ontario, including Toronto, into the 60-cycle service.

U.S. Atomic Development

The U.S. National Security Resources Board has urged the Government to encourage greater participation by private enterprise in the development and use of atomic energy as a source of power. This was one way, the Board said in a report to President Truman, that the U.S. could plan to insure against exhaustion of its resources of strategic materials. The report recommended that an amendment be framed to the Atomic Energy Act specifying conditions under which private interests "could operate commercially to benefit from their atomic power, research, development and production." It also forecast that material resources now considered exhaustible may eventually prove to be renewable as we learn to convert and use the elements in the oceans and atmosphere, as well as in the land surface of the earth. Other steps recommended by the Board after six months' study of long-term materials and energy supply problems included: laws authorising U.S. participation with Canada in construction the St. Lawrence Seaway and Power project, and providing for other river developmer .

Swiss Project

The Swiss Federal Railways and the Central Schweizerischen Kraftwerke of Lucerne have decided jointly to form a new company. This concern is to be responsible for a project to build a dam near Goeschenen (St. Gotthard). Water power thus provided will permit the production of over 300 million kWh annually, it is stated.

Electrification in Poland

Under Poland's six-year plan special emphasis is being given to rural electrification work. Our latest report of these activities shows that in the first six months of 1952 a total of 536 villages were given a supply. By the end of the six-year plan—in 1955—it is expected that 50% of the total number of villages in Poland will have electricity. Already 1,900 co-operative farms out of a total of 4,500 have electric power, it is stated, while the number of State farms electrified in 1952 is given as 129—a dozen more than in the previous year. According to the report, State farms are availing themselves of electric power to an ever greater extent in the mechanisation of labour-absorbing work in the cultivation of plants and in livestock breeding. For instance, the number of electric milkers increased threefold in 1950, 4½ times in 1951, and fivefold in 1952. By the end of 1952 the number of incubators increased tenfold over that of 1949 and the number of electro-mechanical appliances for sheep-shearing was over 16 times higher than in 1950.

Uganda's Need

A further £7 million sterling is needed by the Uganda Electricity Board to enable its projects to be carried through without unnecessary delays. The Uganda Government is seeking powers to borrow the necessary money. With the London loan market closed to East Africa until June, 1954, it is considered likely that the Uganda Government may seek help from the World Bank, whose officials recently visited the protectorate. At present the Governor has authority to raise £13 million for electricity schemes, and a new Bill, if passed, will increase this to £20 million. The main reasons for the new money are to meet the increased costs of building the Owen Falls dam at Jinja, a share of the cost of constructing the 240-mile power line from the dam to the copper deposits at Kilembe, and installing new generators to meet increased requirements.

Another Worry

Apart from the financial worries noted above, the Uganda Electricity Board was confronted with another difficulty last week—a departmental engineering train crashed into the sliding door of the Board's new power station near Jinja, causing damage estimated at £60,000. The train careered on inside the building, striking and seriously damaging one of the eleven Harland and Wolff 940 kW diesel generating sets which was being overhauled and lay partly dismantled across the railway line, according to the report.

Tunis Plan

A company is to be set up in Tunis, under the title of Forces Hydro-Electriques de Tunisie, to build and exploit two power stations. One will be built at Nepveur, near the Oued-el-Lil dam, and the other at Fernana, close to the Oued Mellegue. Combined output of the two plants is scheduled at 35-40 million kWh—or about one-fifth of the country's annual current consumption. The company is also to build a 150 kV line to Tunis and one, via Bone, linking up with the main Algerian grid.

Discussions on Kafue Scheme

In connection with the Kafue Gorge hydro-electric scheme, Sir William Halcrow, the London consultant civil engineer to the Northern Rhodesia Government on the project, left Britain last week for Lusaka to present the consultants' final report to the Government. The Kafue Gorge scheme would utilise the Kafue River and is complementary to the Kariba Gorge project in the Zambesi River. Its chief advantage is that it would provide power to the copper belt much earlier. In earlier reports it was estimated that 385 MW could be generated at Kariba Gorge and 380 MW at Kafue Gorge.

Dacca Acquisition

The East Pakistan Government has granted a loan of Rs. 3,350,000 to the Dacca Electricity Development Co. (a government-sponsored concern) for the purchase of assets and liabilities of the existing Dacca Electricity Supply Co., to which arrangement we referred on October 2. The bulk of the loan will be used for the payment of assets and liabilities of the old company, but Rs. 600,000 has been earmarked for the purchase of new equipment, much of which had already been ordered by the former concern.

Set Repaired

Out of commission for over three months, the 38 MW generator at Richmond power station of the State Electricity Commission of Victoria has been put into operation again, we hear. Apparently the set was severely damaged in September when a fan blade shattered and fragments entered the rotor. An engineer from the Swiss manufacturers flew out to Melbourne to supervise the repair work, which was carried out quicker than anticipated.

Nationalisation

The Indonesian Government has now decided to nationalise the electricity and gas companies. One of the largest concerns which will be affected is the Netherlands Indies General Electricity Co., of Amsterdam, (A.N.I.E.M.), which has an authorised capital of 21 million guilders.

NEW YEAR HONOURS

THE New Year honours list of H.M. The Queen, announced last Thursday, contains many names of individuals prominently associated with the electrical industry. First to catch the eye are the knighthoods awarded to **Mr. C. K. F. Hague,** M.I.Mech.E., M.I.E.E., deputy chairman and managing director of Babcock and Wilcox Ltd., and deputy chairman of the R.O.F. Board; to **Dr. H. Roxbee Cox,** M.I.Mech.E., F.R.Ae.S., chief scientist to the Ministry of Fuel and Power; to **Mr. Arthur Croft,** chairman and managing director of Crofts (Holdings) Ltd. and Crofts (Engineers) Ltd.; to **Mr. A. G. E. Briggs,** deputy controller of Supplies, M.o.S., and joint assistant managing director of Tube Investments Ltd. (Electrical Division); to **Mr. R. J. Hunt,** chairman, Ransomes, Sims and Jefferies Ltd.; and to **Mr. B. E. Nicholls,** C.V.O., C.B.E., former director of home broadcasting and lately acting director-general of the B.B.C. Upon **Lord Brabazon of Tara,** P.C., M.C., who was president of E.D.A. from 1943 to 1948, and has many other electrical associations, has been bestowed the G.B.E. for his services to civil aviation. A similar honour is awarded to **The Earl of Limerick,** K.C.B., D.S.O., T.D., chairman of Parnall (Yate) Ltd., for his work for the Territorials and other auxiliary Forces.

Mr. C. K. F. Hague (Knight)

Mr. R. L. Batley (O.B.E.)

C.B.E.

Among those who receive the C.B.E. are **Mr. H. F. Carpenter,** F.C.I.S., F.S.A.A., for services as secretary to the British Electricity Authority, from which post he retired in June, 1951; **Mr. H. A. Cruse,** director and general works manager of the Westinghouse Brake and Signal Co.; **Mr. W. D'Arcy Madden,** chairman and managing director, Hick, Hargreaves and Co. Ltd.; **Mr. F. I. Ray,** B.Sc.(Eng.), M.I.E.E., regional director, London Telecommunications Region, G.P.O.; **Mr. A. Read,** M.B.E., director and secretary, Powell Duffryn Ltd.; **Mr. J. A. Smale,** A.F.C., B.Sc., M.I.E.E., engineer-in-chief of Cable and Wireless Ltd. and **Mr. A. H. Topham,** A.M.I.E.E., joint managing director of Mawdsley's Ltd.

O.B.E.

For his services as chief generation engineer, Merseyside and North Wales Division, B.E.A., **Mr. R. L. Batley,** A.M.I.Mech.E., has been awarded the O.B.E. Mr. Batley has, of course, now taken over the position of controller of the Midlands Division. Other recipients of the O.B.E. are **Mr. A. A. Dyson,** managing director of Erie Resistor Ltd., and **Mr. J. R. Potts,** J.P., a part-time member of the North Western Electricity Board and a director of H. J. Baldwin and Co., Ltd. and of Wireohms Ltd.

M.B.E.

Awards of the M.B.E. have been made to **Mr. F. Fletcher,** manager, special technical productions, General Electric Co. Ltd.; **Mr. A. S. Helms,** lately generation engineer (operation), South Eastern Division, B.E.A.; **Mr. D. G. Jones,** works cost accountant, E. K. Cole Ltd.; **Mr. L. A. Jouning,** who has been works manager to Aron Electricity Meter Ltd. for the past nine years; **Mr. C. H. Petford,** M.I.E.E., A.M.I.Mech.E., personal assistant to the divisional controller, Midlands Division, B.E.A.; **Mr. E. Salthouse,** chief draughtsman, Electrical Drawing Office, Harland and Wolff Ltd.; **Mr. E. J. Trapnell,** area secretary, Somerset and Gloucestershire, Electrical Trades Union; **Mr. W. E. Watson,** area works manager, S. Smith and Sons (England) Ltd., Cheltenham; **Mr. T. S. Wood,** chief draughtsman, Electrical Department, John Brown and Co. Ltd., and **Mr. J. F. Booth,** managing director of the Hepworth Iron Co. Ltd.

B.E.M.

Among those to whom the B.E.M. has been awarded are **Mr. V. A. Aldous,** lathe turner, English Electric Co., Rugby; **Mr. F. Askem,** electrician, Darwins Ltd.; **Mr. S. M. T. Beach,** foreman, Ferguson Pailin Ltd.; **Mr. W. T. Foster,** shift electrician, London Electricity Board, Morden; **Mr. A. J. Harwood,** turbine driver, Oxford generating station, Southern Division, B.E.A.; **Mr. P. Lewis,** shift substation attendant, Merseyside and N. Wales Electricity Board, Liverpool; **Mr. J. S. McArthur,** foreman linesman, Birmingham transmission section, Midlands Division, B.E.A.; **Mr. A. Stronge,** construction foreman, Electricity Board for N. Ireland, Lisburn; **Mr. J. Walker,** installation inspector, Fife sub-area, S.E. Scotland Electricity Board, Methill; and **Mr. G. W. Wildman,** boiler house foreman, Greenhill generating station, North Western Division, B.E.A.

ABROAD

Overseas recipients of awards include **Mr. H. T. Bennett,** O.B.E., managing director of the Marconi Telegraph Co. of Egypt, and **Mr. F. P. Egerton,** M.I.E.E., deputy chairman and general manager of the Central Electricity Board, Federation of Malaya, who both receive the C.B.E.; while **Mr. L. J. King,** M.I.E.E., resident engineer in London of the Electricity Corporation of Nigeria, gets the O.B.E. and **Mr. A. G. Bourhill,** assistant power station superintendent, Electricity Department, Singapore City Council, the M.B.E.

PERSONALITIES

IN THE INDUSTRY

Mr. E. A. Bromfield, whose appointment as general secretary of the Association of Supervising Electrical Engineers, in succession to the late Mr. A. Brammer, we exclusively reported in our December 25 issue, has now taken up his new duties. Mr. Bromfield was previously principal assistant with the Electrical Contractors' Association and allied Associations. He has had wide experience of administration organisation and public-speaking, negotiations with Government departments and industrial legislation. Earlier appointments included the secretaryship of the senior association for the Hairdressing and Allied Trades and a regional secretaryship with the employers' organisation for the Laundry industry. For a number of years he held appointments in the legal and finance department of municipal authorities.

Chairman of Sharples Centrifuges, Ltd., **Mr. W. J. Murray,** has retired, but he retains his seat on the board as a director. As chairman, he is being succeeded by **Mr. A. H. Keable,** M.I.Mech.E., M.I.Chem.E., who started the business in this country in 1920 and has been managing director since 1928. **Mr. G. P. Balfour,** B.Sc., A.C.G.I., A.M.I.Chem.E., will fill the vacancy created by Mr. Keable's promotion, and **Mr. G. J. Keady,** president of the Sharples Corporation, Philadelphia, has also joined the board of the British company.

The Harland Engineering Co. Ltd. announce that **Mr. F. Carleton Anderson,** one of their founder directors, has retired, and **Mr. W. Scott** and **Mr. L. Spiro,** both long-service members of the staff of the company, have been appointed to the board of directors.

Mr. H. Campbell, vice-chairman and general manager of Campbell and Isherwood, has been elected chairman of the company in succession to the late Mr. G. F. D. Campbell.

Mr. H. A. Cruse (C.B.E.)

Mr. L. A. Jouning (M.B.E.)

Two recipients of honours in the New Year's List noted on the opposite page

Last week brought the retirement of **Mr. Fitzroy Woods,** M.B.E., M.I.E.E., sub-area liaison officer and Woking district manager of the South Eastern Electricity Board. He went to Woking in 1918 as resident engineer to the Woking Electric Supply Co., and later became chief engineer and general manager to the company. Earlier, he had served with London Underground Railway, London United Tramways, Belliss and Morcom Ltd., the Heston and Isleworth undertaking, Lancashire Electric Power Co., and as station superintendent and chief assistant at Rawtenstall. Mr. Woods has taken active interest in the A.T.C., being president of the 1349 Squadron, and for this work he gained the M.B.E. in 1950.

Mr. F. Woods

The appointment of three chief engineers and promotions of other executives have been announced by the Quebec Hydro-Electric Commission. **Mr. J. E. Leo Roy,** formerly in charge of the transmission and distribution section, has been named chief engineer of auxiliary services. **Mr. D. M. Farnham** succeeds **Mr. G. C. Read** as chief engineer of the engineering design division, and **Mr. J. H. Wheatley** is now chief engineer of the shops and transportation department with general supervision over the new service centre. **Mr. H. W. Haberl** has been named assistant chief engineer of the engineering design division; **Mr. J. R. Hango** is now system planning engineer; **Mr. A. Benjamin** becomes distribution engineer; **Mr. M. P. Gunning** is assistant distribution engineer; **Mr. R. Gauthier** succeeds Mr. Roy as superintending engineer of the transmission and distribution section; and **Mr. M. St. Jacques** has been nominated his assistant.

Following the receipt of the encouraging news concerning **Mr. H. Nimmo,** chairman of the Southern Electricity Board, which we noted in our last issue, we were very sorry to learn that Mr. Nimmo did not leave hospital but had to undergo a further operation.

The Ulster Minister of Commerce has reappointed five members of the Electricity Board for Northern Ireland for a further period of two years. They are **Major C. A. M. Alexander,** M.C., D.L.; **Mr. A. G. Alego,** C.B.E.; **Mr. W. A. Mullen,** D.L.; **Mr. A. Shiells** and **Mr. James Walker,** F.C.A. Mr. Walker, as already announced, will be chairman of the Board for the ensuing two years, in succession to Sir William Robinson, who has retired for business reasons.

D

After 20 years' service with Standard Telephones and Cables Ltd., **Mr. W. F. Litherland,** Bristol office manager since 1940, has joined Denman Electrical Supplies Ltd., of Bristol, as director. Mr. Litherland commenced his career in 1923 with Ward and Goldstone Ltd., moving to W. E. Beardsall and Co. Ltd. in 1927. Five years later he joined S.T. and C. as northern representative, eventually becoming sales promotion manager of the Brimar Valve Division. A transfer to Kolster Brandes Ltd. in a similar capacity was interrupted by the war, when he was moved to Bristol as S.T. and C. branch manager.

Mr. W. F. Litherland

Among various recipients of awards made by H.M. The Queen for their part played in the North Devon flood disaster on August 15, **Mr. C. H. Postles,** engineer-in-charge, and **Mr. R. N. Freeman,** switchboard attendant, Lynmouth generating station of the South Western Division, B.E.A., have received the Queen's Commendations for brave conduct.

Mr. A. C. Carse, F.A.C.C.A., accountant in the Dumfries and Galloway sub-area of the South West Scotland Electricity Board, has been appointed to a similar position with the Board's Ayrshire sub-area, and **Mr. T. F. C. Walker,** B.L., B.SC.(Econ.)., A.C.I.S., at present principal assistant in the Secretary's Department at the Board's headquarters, is to become secretary of the Dumfries and Galloway sub-area.

The Minister of Fuel and Power has made the following re-appointments of part-time members of the Electricity Boards: *London*—Mrs. G. H. Dunbar, O.B.E., and Mr. W. J. H. Wood, M.I.E.E., M.I.Mech.E.; *Southern*—Ald. J. P. D. Lacey, O.B.E., J.P.; *South Wales*—Mr. Basil Curran and Principal Robert James, wh.SC., D.I.C., M.I.Mech.E., A.R.C.S.; *Merseyside and North Wales*—Mr. J. A. Duncan, B.SC., Mr. G. K. Paton, M.I.E.E., and Sir Arthur Pickup; *North Eastern*—Ald. J. W. Mitchell; *South East Scotland*—Mr. G. McLaren, C.B.E., J.P., and Sir Ernest Wedderburn, O.B.E., D.L., D.SC., LL.D., D.K.S.; *South West Scotland*—Mr. Jackson Millar, C.B.E., J.P. Also appointed a part-time member of this board is Commander G. H. Hughes-Onslow, D.S.O., R.N.(Retd.), who succeeds Mr. J. B. Mavor, M.I.E.E., M.I.Mech.E., who has retired from that office on completion of his term.

Mr. A. Trebucq has relinquished the position of joint managing director of H. J. Enthoven and Sons upon his appointment as deputy chairman of the company. **Mr. K. L. Cobb** is now the sole managing director.

One of the founder-directors of Ewbank and Partners Ltd., the engineering consultants, **Mr. T. E. B. Boothby,** A.M.I.E.E., M.I.F., retired on December 31 last, but his services are still available to the company in a consultative capacity. To fill the vacancy created by Mr. Boothby's retirement, **Mr. G. E. Wheeler,** M.I.Mech.E., M.Inst.Pet., has been appointed a director with effect from January 1, 1953. Previous to joining Ewbank and Partners in June of last year, Mr. Wheeler was with the Anglo-Iranian Oil Co. Ltd. for about 27 years, having held the position of works manager, Abadan, and at the time of leaving their service, was manager of their Engineering Division, Refineries Department, London.

Sir Edward Appleton was last week installed as president of the British Association for 1953.

Mr. W. M. B. Veitch, M.I.E.E., deputy chief engineer of the New Zealand Post Office has retired after 42 years' service. He is succeeded by **Mr. G. R. Milne,** B.SC., A.M.I.E.E., M.N.Z.I.E., formerly superintending engineer.

The appointment, with effect from January 1, of two branch managers to succeed Mr. R. S. Gough (Bristol) and Mr. T. R. Thomas (Cardiff), whose retirement we noted last week, is announced by British Insulated Callender's Cables, Ltd. The new branch manager at Bristol is **Mr. T. L. Purves,** who served his electrical engineering apprenticeship with Fraser and Borthwick, Ltd., and gained technical education at the Royal Technical College, Glasgow. In 1928 he joined the Anglo-Saxon Petroleum Co., Ltd., as an electrical engineer in the South American oilfields, and a few years later returned to the U.K. as lighting sales engineer in South-West of England for Philips Electrical, Ltd. During the war he was with the B.B.C. Engineering Section, leaving in 1947 to join B.I.C.C. as a sales engineer with the Capacitor Division. **Mr. L. R. Greet,** who has been appointed branch manager at Cardiff, was with the Cardiff Corporation until 1924, when he joined the former British Insulated Cables, Ltd. As a sales representative in Glamorgan, Monmouth and Brecon, and subsequently as chief assistant at the Cardiff branch office, he has represented the company in the electricity supply industry and in the industrial, manufacturing and commercial communities of South Wales.

Mr. T. L. Purves

Mr. L. R. Greet

Dewrance and Co. Ltd. announce that **Mr. R. W. Ogden,** Birmingham office manager, is resigning at the end of January and leaving the engineering industry. He is succeeded by **Mr. A. Brown,** formerly representative for the Yorkshire area, which is taken over by **Mr. R. E. F. Ellwood,** located in Leeds.

Engineer Rear-Admiral C. W. Lambert, C.B., who is now general works manager of the Appleby-Frodingham branch, at Scunthorpe, of the United Steel Companies, Ltd., will retire at his own request on June 30, 1953. It is intended that he shall be succeeded by **Mr. Albert Jackson,** who is at present works manager (steel) and deputy general works manager. As from January 1, **Mr. T. P. Lloyd,** B.SC., A.I.M., T.D., has been appointed assistant works manager (steel) in which capacity he will assist Mr. Jackson. On July 1, consequent upon the appointment of Mr. Jackson as general works manager, **Mr. T. P. Lloyd** will be appointed works manager (steel).

Mr. A. G. E. Briggs, joint assistant managing director of Tube Investments Ltd. (Electrical Division), who was loaned to the Ministry of Supply as Deputy Controller of Supplies (Munitions Production) in March 1951, relinquished this appointment at the end of last year, and has resumed his full-time duties with the company. We note on page 74 that the honour of Knight Bachelor is to be conferred on Mr. Briggs.

Four chairmanship appointments for 1953 are announced by the C.M.A. **Mr. F. Waine,** J.P., a director of British Insulated Callender's Cables, Ltd., becomes chairman of the Cable Makers' Association, in succession to Mr. E. C. Holroyde of Crompton Parkinson, Ltd. The new chairman of the Mains Cable Manufacturers' Association and the Mains Cable Manufacturers' Association (Super Tension) is **Mr. F. V. Vaissiere,** general sales manager of W. T. Henley's Telegraph Works Co., Ltd. **Mr. J. S. A. Bunting,** M.C., a director of the Edison Swan Electric Co., Ltd., has been appointed Chairman of the Rubber and Thermoplastic Cable Manufacturers' Association for the second year in succession, and **Mr. C. W. Cawte,** of Johnson and Phillips, Ltd., has been nominated as chairman of the Overseas Rubber Cable Manufacturers' Association for the ensuing year.

Mr. H. M. Crellin (left) with Mr. C. W. Riley

Two long-serving members of the staff of W. T. Glover and Co. Ltd. retired at the end of December. These are **Mr. H. M. Crellin,** A.M.I.E.E. (52 years' service), manager of the Test Department, and **Mr. C. W. Riley** (40 years' service), Cost Department, both of whom were presented with gifts from their colleagues by **Mr. R. M. Fairfield,** director and general manager. Mr. Crellin is well known in the cable industry as a pioneer in the development of spark testing of rubber insulated cables which came to the fore during the first world war, and as a result of his work the spark testing method was accepted and incorporated in the B.S.7 specification for rubber cables, 1939. He worked in close co-operation with the Underwriters Laboratories Inc. of New York, who presented him with a "Sensitivity—and Voltage—Calculator Unit" in 1939 inscribed "In recognition of his pioneering work in the field of standardisation of spark tests of insulated wires."

Mr. R. P. Browne, secretary of the Radio Industry Council, has entered Fielden House, London Hospital, for an orthopaedic operation and has been given leave of absence for some months, we learn.

Mr. C. Harman Harris has retired from the board of the Sturtevant Engineering Co. He joined the company in 1909 and was appointed a director in 1942. **Mr. M. Gueilikman** who joined the company in 1915, has been appointed to the board.

Mr. F. Waine

Mr. F. V. Vaissiere

Mr. J. S. A. Bunting

Mr. C. W. Cawte

Mr. J. Stewart Robertson has been appointed assistant general manager of Babcock and Wilcox Ltd. He joined the company in 1935, after an apprenticeship with the General Electric Co. Ltd. Following erection and service experience he was on B. and W.'s staff at the Calcutta office until 1940. After the war he represented the company in New York from 1946 until 1950, when he returned to the U.K. and was appointed manager of the Commonwealth Sales Department at head office. Babcock and Wilcox also announce that, due to the integration of the trading activities of the Stirling Boiler Co., **Mr. S. J. Whybrow** has been appointed manager of the Commonwealth Sales Department of the parent company. Mr. Whybrow joined the Stirling Boiler Co. in 1927 and was appointed director and general manager six years ago.

The directors of Smith Meters Ltd., have appointed **Mr. F. W. King**, works manager at the Streatham Works, to the board. Mr. King has been with the company for 33 years, for 10 years as works manager.

Mr. David Higgs, B.SC., has been appointed managing director of Higgs Motors Ltd. He is the son of Mr. Walter Higgs, M.I.E.E., chairman of the company.

Mrs. E. E. Gandar, supervisor of the Queen's House Typing Department of the English Electric Co. Ltd., retired at the end of December after 33 years' service.

Mr. V. Watkins, at present maintenance manager, has been appointed deputy chief engineer of the Steel Peech and Tozer Branch, at Rotherham, of the United Steel Companies, Ltd.

Mr. F. A. Lawson, having vacated his seat on the board of Siemens Bros. and Co. Ltd., has in consequence also vacated his seat on the board of Submarine Cables Ltd. **Mr. J. N. Dean** has been nominated by Siemens and elected chairman of Submarine Cables Ltd. for the remainder of Mr. Lawson's term of office, i.e. until September 30, 1953. **Mr. H. E. Humphries,** who was recently managing director of Siemens, has been appointed by that organisation to be a director of Submarine Cables Ltd. to fill the vacancy caused by Mr. Lawson leaving that office.

Mr. H. H. Harper, A.M.Brit.I.R.E., has been appointed area sales representative of Evershed and Vignoles Ltd. for South Wales and South West England. He has been associated with the electronic and light current industries since 1934, and joined the company in 1948 as a general technical sales representative. He takes up his new duties this month following the retirement of **Mr. S. B. Haslam,** who has been the company's agent in South Wales for many years.

Mr. T. H. Brooke has joined the board of directors of Redfern's Rubber Works Ltd. He is the company's London manager and a member of the management board.

The Brush Aboe Group announce that **Mr. M. Tattersfield,** A.C.A., F.C.C.S., M.I.I.A., has been appointed group controller of accounts. He has been associated with the Owen Organisation as a director and secretary of Electro-Hydraulics, Ltd., and Conveyancer Fork Trucks, Ltd., and a director of Electro-Hydraulics (Canada), Ltd.

Mr. M. C. Blythe, having accepted the appointment of sales manager to Brush Electrical (Australia) Pty. Ltd., **Mr. C. J. Stewart,** B.SC., has been appointed as acting manager of the Newcastle office of the Brush Electrical Engineering Co. Mr. Stewart has for some years been with the Switchgear Division of the B.T.H. Co.

In accordance with his statement at the last annual general meeting, **Mr. R. W. Cooper,** M.C., chairman of the British Aluminium Co. Ltd., has resigned his directorship. **Viscount Portal of Hungerford,** K.G., G.C.B., O.M., D.S.O., M.C., who is a director of the company, has now succeeded Mr. R. W. Cooper as chairman. In addition **Mr. E. F. O. Gascoigne** has been appointed a director.

OBITUARY

Mr. S. H. Busch, M.I.E.E., who was managing director of ASEA Electric Ltd., from 1910 until his retirement in 1946, died on January 2, aged 69. He remained chairman of the board of the company until the end of June, 1947, when he resigned that post to take up permanent residence in Belgium. A man of great personality and of considerable business acumen, he was as well known in the Commonwealth countries as he was in Gt. Britain.

Mr. S. H. Busch

Mr. W. P. Adams, M.I.E.E., A.K.C., died on January 4, aged 87. He started his own business as a consulting engineer in 1898, specialising in such subjects as utilisation of water power and electric heating and cooking.

Mr. A. O. Davis, who, for 47 years, was in charge of the woodworking and cabinet making Department of J. H. Tucker and Co. Ltd., died on December 27. He joined the firm in Sampson Road North and on removal of the factory to Hay Mills in 1907, laid out and machined what was then probably the most advanced cabinet and wood polishing shop in the Electrical Trade.

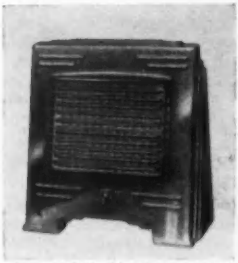
Mr. Charles Selz, who founded the lampshade manufacturing concern of that name, died on December 29, aged 74.

Mr. H. Shackleton, who was with Geo. Bray and Co., Ltd., for forty years, died on January 1, aged 72. He had been primarily concerned with experimental work, and was engineering laboratory assistant for about twenty years.

The BUYER'S *Column*

MEM Fires in Production Again

FOLLOWING the lifting of certain restrictions on the manufacture of electric fires as from December 30 last, the MIDLAND ELECTRIC MANUFACTURING CO., LTD., Redding's Lane, Tyseley, Birmingham 11, have announced that they are proceeding immediately with the reintroduction of certain of their electric fire models.



The MEM Mayfair model

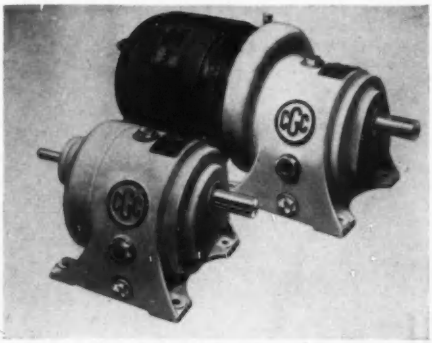
Two models will be available almost immediately; these are the Memray swivel reflector type and the Mayfair flat bar type, as illustrated, in 1 and 2 kW sizes.

Coventry Geared Motors

RECENTLY added to the range of geared motors marketed by THE COVENTRY GEAR CO., Brooklyn Road, Foleshill, Coventry—a David Brown Group company—is the Size 3 unit.

This is available in either double or triple reduction form, and has consequently a wide range of application.

With a motor speed of 1,425 r.p.m., a choice of 17 output speeds ranging from 25-345 r.p.m. is available, with an equivalent variation of input powers from 1·25 to 5 h.p.



The geared motor unit in this case incorporates a Brook motor

Versatile in application the motors can be mounted in any of several positions. With the gears and motors integral the units are installed as simply as electric motors. Weight (excluding the motor) of the double reduction unit is 105 lb and the triple reduction 110 lb.

Any type of motor up to 14 in. diameter may be fitted to suit individual requirements, and also the gear units are available without motors. In such cases, the motor adaptors are replaced by modified covers and the input and output shafts are co-axial.

Maximum load is equivalent to a steady tangential load of 800 lb at a radius of 1 in. when applied midway along the shaft extensions, whilst the oversall efficiency of the No. 3 unit is approximately 96% in its double reduction form and between 94 and 95% as a triple reduction unit.

Two New G.E.C. Refrigerators

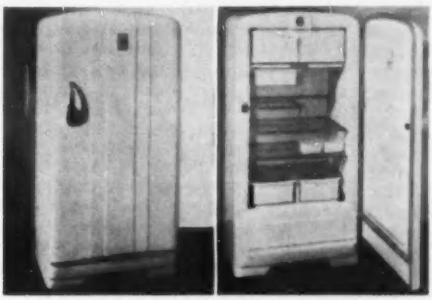
TWO new domestic refrigerators, both of 7 cu ft capacity, have been produced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2. One, the DMM.71, embodies all the essential features at a minimum price, whilst the other, the DMJ.71, is a de luxe model able to compete with the best in world markets. This de luxe model is claimed to be the first British made 7 cu ft domestic refrigerator to incorporate a full width freezer.

Both new models occupy no more floor space than the company's 5·3 cu ft model. Their height, however, is increased by 2 in. Both have sealed refrigeration units which require very little attention and do not cause radio and T.V. interference.

They have steel all-welded cabinets with interiors finished in white acid-resistant non-toxic vitreous enamel.

Other features include thermostatic control at shoulder level, a stainless steel freezer incorporating a shelf for ice-making, an extra deep plastic meat or fish chiller, plastic saladors reaching to the back of the refrigerator, a special door catch which closes fast at the slightest touch, and ample provision for the storage of tall bottles.

The interior is automatically lighted when the door is opened and the bottom of the interior is at a reasonable height above the floor. Prices of the units including tax are £147 7s. 7d. for the DMJ.71 and £137 10s. for the DMM.71.



DMJ.71's attractive exterior conceals a capacious interior

New Crypton Charger

IT is claimed by CRYPTON EQUIPMENT LTD., Bridgwater, Somerset, that a vehicle with a completely flat battery can be started in one to five minutes with the aid of their new Fast Charger and Engine Starter. This portable model AF.5. 1260, whilst it is a simplified and cheaper edition of the Crypton fast charger Analyser, produces the same full rate of charging output of 100 amp for 6 V batteries and 80 amp for 12 V batteries. It can also be used for battery boosting and slow charging. Net trade price for this unit for 200/250 V a.c. supplies is £85. Slow rate charging panel is 50s. extra.

"Coldrator" Prices Down

IT is announced by the INTERNATIONAL REFRIGERATOR CO. LTD., Fletton, Peterborough, that the list prices of their range of "Coldrator" domestic refrigerators have been reduced as from January 1, 1953.

The new prices with purchase tax are shown as follows :—

Model CD.3, 3 cu ft table top model
£59 10s. P. tax £29 2s. 5d.

Model CT.45, 4½ cu ft table top model
£69 10s. P. tax £34 6s. 5d.

Model CS.70, 7·1 cu ft styled cabinet
£92 10s. P. tax £46 5s. 8d.

All these refrigerators are guaranteed under the Coldrator five year protection plan.

New Meritus Spot Welders

A RANGE of air-operated spot welders has now been introduced by MERITUS (BARNET), LTD., Wood Street, Barnet, Herts.

This includes spot-welding machines with a nominal rating of 20 kVA and 40 kVA which are also available with the addition of the Meritus Patented "Autoforge" electronic control which makes the machine completely automatic.

The A.S.20A and A.S.40A models are identical in specification except that as mentioned the former has a nominal rating of 20 kVA and the maximum (short-circuit rating) being 40 kVA, and the second model has a rating twice that in both cases. Both are designed for heavy duty, being liberally rated and efficiently insulated and impregnated. The output is controlled by a six position rotary action knife switch of ample current-carrying capacity, fitted in an easily accessible position. The secondary arms are of high conductivity solid drawn copper and the standard effective working length is variable between 8 in. and 24 in.

The machine is operated by a two-way compressed air cylinder applying pressure through a rocker beam, the air cylinder operation being controlled by a robust foot-operated air valve. Electrode "hammer blow" is eliminated by a special Electrode Cushion Control.

The duration of the welding cycle is controlled by means of a specially designed pressure switch (ensuring adequate tip pressure) in conjunction with the Meritus Electronic Timer, giving close and accurate control of the welding cycle over a range varying between 3/50th and 5 seconds. The timer is designed to operate only after the welding current has commenced to flow, thus giving consistent welding times irrespective of the surface condition of the material being welded.

The electrode holders are fully water cooled and fitted with the necessary rubber hose and connectors. The water-cooling system includes a special splash-proof waterflow indicator.

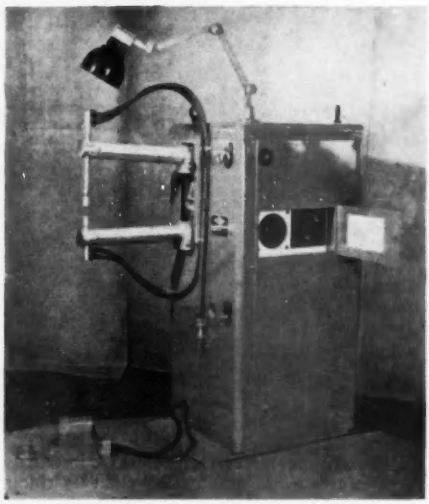
The general specification of the Meritus spot welders, type A.S.40 A2 "Autoforge," is as above. In addition these models are fitted with the Meritus Patented "Autoforge" Electronic Control, which makes the machines completely automatic in all respects, it being impossible for the operator to "beat the timer" after the welding cycle has commenced, and also giving close and accurate control of the after-weld forging period. Air cylinder operation is controlled through a foot switch and solenoid air valve in conjunction with the "Autoforge" control. A small switch on the control panel changes the welding cycle from "single spot" to "stitching." Average stitch welding rate, 120 spots per minute.

Welding Capacity of A.S.20A and A2 Models

2x14 s.w.g.	mild steel	...	24 in. throat depth.
2x10 s.w.g.	,, ,,	...	18 in. ,, ,,
2x 8 s.w.g.	,, ,,	...	10 in. ,, ,,
2x20 s.w.g.	aluminium	...	8 in. ,, ,,

Welding Capacity of A.S.40A and A2 Models

2x12 s.w.g.	mild steel	...	24 in. throat depth.
2x 8 s.w.g.	,, ,,	...	18 in. ,, ,,
2x 6 s.w.g.	,, ,,	...	10 in. ,, ,,
2x18 s.w.g.	aluminium	...	15 in. ,, ,,
2x16 s.w.g.	,,	...	10 in. ,, ,,



Spot welding is efficient with the new Meritus units

The WEEK in NEWS

Manufacture of Electrical Appliances Decontrolled

Firms allowed to Produce Unlimited Quantities

CONTROLS on the manufacture and supply of electrical equipment, introduced during the war by the Board of Trade, have been terminated as from December 30. An announcement to this effect has been made by the Ministry of Supply and the appropriate revocation orders issued. The purpose of the original orders was primarily to reduce to a minimum the manufacture of these semi-luxuries, in view of the demands of wartime, which could result in a valuable saving of both materials and labour. The orders revoked are the Electrical Appliances (control of Manufacture and Supply) Orders, 1942 and 1943 (issued on July 24 and June 7 of those years respectively),and the Machinery, Plant and Appliances Orders of 1945 and 1948 (issued on June 4 and November 22 respectively).

Manufacturers of the goods concerned had to obtain a licence from the Ministry of Works before producing the commodities, and the quantity of equipment made was restricted. When in 1948, open licences were issued, there was considerable relaxation of these restrictions, but the manufacture and supply of hotplates, space- and water-heaters, continued to be rigidly controlled right up to December 30 last. Added to this, of course, was the curtailment resulting from the discriminate allocation of materials which acted as a secondary restriction. As from the New Year, manufacturers can supply unlimited quantities of electrical apparatus, the most marked effect taking place among producers of space- and water-heaters.

Among the items decontrolled, are laundering and refrigerating, equipment, cooking, pressing, drying and heating apparatus, pads and blankets, shavers, fans (with motors not exceeding one-tenth h.p.), vacuum cleaners, smoothing irons, lighter elements, hair and hair-drying machines, and curling and waving irons.

Conference on Static Electricity

THE Institute of Physics is arranging a conference on Static Electrification. It is to be held at Bedford College, London, between March 25 and 27, and a full programme covering the three days is expected to be issued shortly. The opening lecture will be given by Prof. F. A. Vick, and other sessions will comprise an introductory survey followed by specialised papers and discussion. The surveys are to be given by Dr. P. S. Henry on "General Principles of Generation an ' Dissipation of Static Electricity"; Mr. E. S. Shire on "Electrostatic Machines"; and Mr. H. W. Swann on "Harmful Static Electrification." Further details may be had from the Institute.

M.E.M. RE-ENTERS FIRE MARKET

IN view of the numerous criticisms levelled against the electric fire during recent months, it might well appear remarkable that at such a time a prominent electrical manufacturing company is re-entering the electric fire market after a lapse of over a decade. Nevertheless, with the revocation of controls on the manufacture and supply of electrical appliances, the Midland Electrical Manufacturing Co. are taking just that step. As soon as the controls ended the company announced the recommencement of production at pre-war levels.

A representative of M.E.M. said last week that they were convinced there was still a considerable market for an efficient fire at a competitive price. They were not at all perturbed, he said, at recent criticisms.

M.E.M. ceased quantity production soon after the outbreak of war. With the introduction of controls, they were permitted to manufacture only a few fires and the small number allotted did not justify the time, labour and expense involved. Production on a small scale was found to be uneconomical.

The First Half-Century

Every year produces a crop of absurdities in the way of impossible inventions. Two very fine specimens for the New Year hail from Italy and America. The Italian genius converts the light and heat of the sun into an alternating electric current, and the American proposes to tap space for an unlimited supply of electricity which he supposes to begin seventeen miles above the earth's surface. He also has a theory that at that distance the action of gravity ceases, and that he can unwind into the ether any number of miles of cable, which will simply fall into space.—*From our issue of January 8, 1903.*

DISPUTE BETWEEN S.W. BOARD AND E.T.U.

A DISPUTE has arisen between the South Western Electricity Board and the Electrical Trade Union concerning the procedure on redundancies. The Board has stated that on December 16 some 28 electricians employed temporarily on contract work at an R.A.F. station failed to attend. They gave no reason, and did not appear during the rest of the week, so the Board had to take to the site a number of permanent S.W. Board employees. The men who stayed away collected their pay due, but their employment cards were posted to them. Mr. E. S. Trapnell, area secretary of the E.T.U., which has officially recognised the dispute, alleges breach of an undertaking regarding redundancies by the Board. Consequent on the latter's attitude, the men involved, gave notice to the Board's representatives that they were taking strike action. The Board's move in bringing in permanent employees, Mr. Trapnell has called 'strike-breaking.' Meetings are being held in the vicinity of the site, to find a solution to the dispute.

OFFICIAL PUBLICATIONS

CENSUS OF PRODUCTION. Vol. 4.—Final Report on Radio and Telecommunications for 1948. H.M.S.O. 4s. 6d.

ELECTRICAL APPLIANCES (Control of Manufacture and Supply) (No. 3) (Revocation) ORDER, 1952. S.I. 2271. Also:

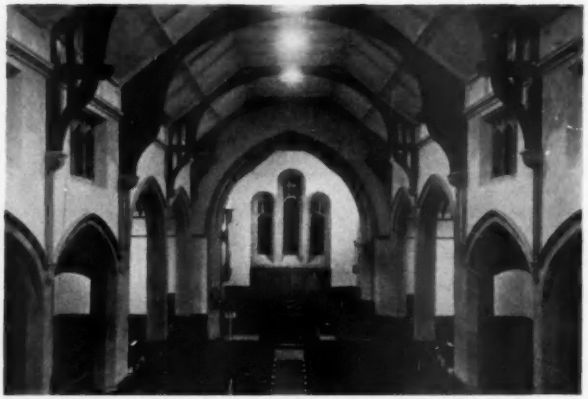
MACHINERY, PLANT AND APPLIANCES (General) (No. 21) (Revocation) ORDER, 1952. S.I. 2270. H.M.S.O. 2d. each. (*See page* 81).

PRINCIPLES FOR GUIDANCE ON BUILDINGS OF EXCESS HEIGHT, ETC. L.C.C. Publication No. 3795. Price 1s. 3d. (*See page* 70).

LONDON BUILDINGS (Constructional) BY-LAWS, 1952. L.C.C. Publication No. 3790. Price 3s. 6d. Explanatory memo on above, L.C.C. Publication No. 3796. Price 1s.

BRITISH STANDARDS B.S. 1894 : 1952. Electrode Boilers. Price 12s. 6d.

CODES OF PRACTICE C.P. 327.101 and 327.102 (1952): Telephones and Telegraphs, Public and Private Services. Obtainable from Council for Codes of Practice for Building, at 7s. 6d. each. (*See page* 68.)



Recessed lighting fittings employed for new installation at St Stephens Church, Edinburgh, give a satisfactory overall distribution of light

Built-in Fittings for Church Lighting

A REMARKABLE installation of lighting has recently been carried out at St. Stephen's Church in Edinburgh. Examples of new church lighting schemes during 1952, gave the impression that hidden fluorescent tubes blending with the design of the church was the trend, but St. Stephen's is now illuminated by built-in lighting units high in the ceiling. These comprise a combination of Holophane high bay concentratng units and armour plate glass. They have been mounted over apertures cut in the ceiling and the glass has been laid over these apertures. The upper side of the glass is frosted to provide softer light and to avoid harsh shadows. Each of the units consists of a prismatic glass reflector housed in a steel spinning fitted with a handle to facilitate easy lamp removals. Maintenance and replacement of lamps may also be said to be easier, as this work can be done in the roof void. Electrical contractors for the scheme were Wm. Barton and Sons Ltd.

Floodlit Soccer

LESS than a month ago we reported the installation of floodlights at St. James's Park for Newcastle United F.C. The vogue of floodlit football is undoubtedly catching on and the first after-dark game has recently been played in Belfast under a system of lighting installed by W. Coates and Son Ltd., in conjunction with Eirco Wholesale Ltd. This most recent scheme is at Grosvenor Park and consists of 47 "Westgate" wide beam floodlights with 1000 W G.L.S. lamps supplied by Philips Electrical Ltd.

STAMPS SCHEME SUCCESSFUL

WE hear from the Bolton district that the experimental scheme introduced in the N. Western Electricity Board's Area for the payment of accounts by purchasing 2s. 6d. stamps in advance, has met with considerable success to date. Last summer the system of selling these "prepayment stamps" was inaugurated at 13 of the Board's service centres and later extended to a further 16 centres, including Bolton, last October. It was reported at a meeting of the Consultative Council's local committee that over a thousand consumers now buy the stamps at the Bolton and Turton showrooms. It is said that the system appears to meet the needs of many consumers who had previously found difficulty in paying their quarterly accounts in one lump sum.

Year's Electrical Research in Glasgow

INVESTIGATIONS into a wide range of problems of electrical engineering interest are recorded in *Report on Research*—1951-52 which has recently been issued by the Royal Technical College, Glasgow. Specially notable were the model investigations carried out for the North of Scotland H.E. Board on various hydro-electric projects. In the thermodynamics field, there were experiments on losses in turbine nozzles and blade passages, and a continuation of the development of measurement techniques in relation to thermo-compressors. Another item of interest concerns the pressure de-watering of peat, which is being investigated as part of the peat-burning gas turbine programme.

During the session reviewed, a large quantity of new equipment was delivered to the department of electrical engineering. This included a 1,500 kV impulse generator and all auxiliaries, a 500 kV compressed gas capacitor and special oscillograph equipment. Work on available apparatus continued in the form of an integrated programme of study on the characteristics of arcs and sparks, and much necessary preparatory preliminary investigation was completed. New studies included one on the voltage regulation of machines with special reference to the characteristics required for modern control systems.

WATFORD FIRM ADOPTS NEW NAME

IT has now been officially announced that Transformers and Welders, Ltd. has changed its name to Transformers (Watford), Ltd. In a statement informing the trade that arrangements had been finalised, Mr. G. B. Proctor, managing director, said the change had been made following the company's decision to concentrate activities on distribution and power transformers, together with the furnace and special types of transformers on which development work had been going on for some 15 years. The company is a subsidiary of London Brick Co., Ltd.

X-RAY LECTURES

A SERIES of ten lectures on X-rays are to be given at the Sir John Cass College, beginning on January 15. Lecturer will be Mr. E. G. Steward, of the G.E.C. Research Laboratories at Wembley, and the talks will be given each Thursday evening at 6 p.m. until March 19.

Appeal for Funds

AN unfortunate accident led, last week, to Col. B. H. Leeson's appeal for funds being reported as an appeal on behalf of the E.I.B.A. Col. Leeson is, of course, president of the I.E.E. and his request was made for the Incorporated Benevolent Fund of that Institution. We sincerely apologise for this misrepresentation.

TROPHY FOR LADIES

It is proposed to institute a Ladies' Golf Competition at this year's B.E.P.C. Hitherto, both ladies and gentlemen have been eligible for the competition organised at the annual convention. Photographed above is the Lady Citrine Trophy which has been presented by Lord Citrine for the new competition. Both matches are held to help swell E.I.B.A. funds

Indian Imports until Next July

THE Indian Government has announced its policy as regards imports for the first half of 1953. Broadly, there is little change from that adopted for the July-December period just finished. Arrangements concerning 70% of the items covered remain, in which category are included motors and generators, cables and wires. Among the commodities for which import quotas were reduced last year are power-driven pumps, and those quotas have now been restored.

Improvements in the quality of some locally manufactured articles has resulted in import quotas being reduced. Falling in this class are torch bulbs.

While the procedures for the issue of import licences remains substantially unaltered, the list of items which may be licensed to actual users has been enlarged and it is proposed to give an opportunity to new-comers to participate in the import trade of numerous items, including fluorescent tubes and electrical instruments.

Electricity Supplies in Anglesey

SOME details of the progress made in the distribution of electricity on the island of Anglesey have been given by the Merseyside and N. Wales Board, in reply to questions raised by the County Council. Since nationalisation, it is stated, 3,112 new consumers have been connected, of which 242 were classified as farms. By the end of next year, it was hoped a further 214 properties in this category would have been connected. The third stage of the Board's rural development plan was now being considered and that part of it relevant to Anglesey and Caernarvonshire should have been studied by this time. As at April 1 last, the total number of electricity consumers in Anglesey was 10,025, compared with 6,913 on April 1, 1948.

Coronation Display may be Hired

SHOP windows at Christmas time invariably present an attractive picture. This year was no exception, and display men will now be turning their attention to plans for the Coronation. Lighting will undoubtedly play a vital part in preparations, and one display in particular, which has been assembled for this festive season by Thorn Electrical Industries Ltd., may well present excellent ideas. It was installed over the holiday at the Electricity showrooms at Crouch End (London), and shows the Mall, with Buckingham Palace and the Victoria Memorial in the background, and the Coronation coach in front. This scene was illuminated by changing colours simulating all conditions of daylight from dawn to dusk. As night falls, the Queen's image appears in the sky above the Palace.

Last Monday the display was moved to the Electricity Showrooms in Baker Street and will be on view there for about a fortnight. After that it will be available for hiring at moderate rates throughout the year.

Belfast — No Deputy Engineer

BELFAST Electricity Committee has suggested that the Council should not appoint an acting deputy city electrical engineer. Asking the Council to approve this decision, the Committee states that, in view of the terms of the appointment of Mr. R. P. Watson as acting city electrical engineer and general manager, it is felt it would be inadvisable to recommend the appointment.

EASTERN BOARD'S DISPLAY CONTEST

FOR the fourth successive year, the Eastern Electricity Board has staged its annual Christmas Service Centre display competition. Following the precedent set in 1950, entries were judged on the appearance of both the window and the interior, but it was found more advisable this year to further subdivide entries, bringing in a third class. Winners of the group comprising large showrooms were Palmers Green, who incidentally won the competition in the first year it was held. March (Cambridgeshire) took first place in the medium-sized class of showroom, and winners among the small service centres were Harringay. All the Board's service centres (about 150) took part in the competition.

COUNCIL CRITICISES ACCEPTANCE OF 2nd LOWEST TENDER

THE acceptance of a tender for equipment for the new Victoria power station in Belfast has caused some severe criticism to be levelled at the city's Electricity Committee. Seven tenders were received for cooling water, switch house and ancillary works, and the second lowest amounting to £391,211 was accepted. This figure, it is understood, was £17,000 more than the lowest tender submitted.

It was explained at the City Council's meeting last Thursday that ordinarily the lowest tender would have been accepted, but there were numerous factors involved. It was stressed that the most important consideration was one of time. Should the new station not be commissioned by target time, there would be load-shedding in Belfast itself and in other parts of the province as well. In the long run the acceptance of the £391,211 tender would probably be best. The minutes were passed.

New Lights along the Brighton Road

ORIGINALLY constructed in 1924 and widened in 1938, the Sutton By-Pass, on one of the main roads between London and the south coast, has recently been illuminated to cope with the increased volume of traffic which that route has had to contend with in the years between 1924 and the present day. Previously the use of headlights was almost imperative in view of the many patches of darkness, but these have been eliminated.

Along the four-mile stretch of road, a total of 156 "Aries" lanterns have been installed, housing 140 W sodium lamps mounted on Stanton columns. This type of lantern provides light-control by a cylindrical crystal glass refractor unit held between cast end-plates with extension arms for suspension from a horizontal bracket tube. Corrosion resistant materials or materials protected against corrosion have been used in the construction of these lanterns.

The installation was designed by Sutton's engineer and surveyor, Mr. N. H. Michell, and equipment supplied by Crompton Parkinson, Ltd.

Sodium lamps and "Aries" lanterns installed along the Sutton By-Pass on the London to Brighton main road

BRITISH AND U.S. FACTORIES COMPARED

REASONS for higher output in American factories, compared with those in Britain, are suggested in a report on production and industrial engineering in the U.S. and Canada, just published for the Department of Scientific and Industrial Research by H.M.S.O. The report has been based on experience of a variety of firms, including mass producers of light electrical equipment. In American factories, it is stated, mechanical aids are used much more, and the worker accepts and expects power tools, fork lift trucks and similar aids. Supplies of raw materials are organised for steady production.

Other facts emphasised in this report are that management is highly efficient and concentrates on managing, and the worker is convinced that living standards depend on increasing output. The report is entitled "A Survey of Production and Industrial Engineering Organisation and Practice in the U.S.A. and Canada," and is priced at 1s.

Electric Cookers to replace the Kwali

THEtraditionalround-bottomed Malay utensil for cooking rice, known as the Kwali, may shortly be replaced by an electric cooker with specially designed radiant hot-plates to the contour of the Kwali and fitted with control devices for simmering. Singapore City Council has ordered 500 of these new cookers made by the G.E.C. and is to hire them to consumers. The company itself is marketing a further 500 in Malaya, and sample cookers are also being sent to Hong Kong, where rice is cooked in the same way. The sales drive precedes the opening of new power stations at Pasir Panjang and Kuala Lumpur. Incidentally, the G.E.C. is sending a demonstrator to the country to teach the Malays cooking.

The new cookers have a modified hob structure to accommodate two Kwalis or one Kwali and a boiling plate, all elements being simmer-switch controlled.

The Television Studio which formed the E.D.A.'s stand at the Schoolboys Exhibition. The stand was mentioned in these columns last week

NEWS IN BRIEF

Cable ship *Monarch* has now been refitted and is to undertake the relaying of a 1,700 miles long cable from Brazil to the Cape Verde Islands for an Italian company.

A lively Christmas party was held recently for some 400 children of employees of the Electric Construction Co.

Mr. H. G. Jenkins, of the G.E.C., addressed a juvenile audience on "Light and Lighting" yesterday at Birmingham University. The lecture was organised by the Royal Institute of Chemistry.

Forty-three long-service employees of Ferranti, Ltd., this year received gold watches and certificates at the annual presentation.

Hoover, Ltd.'s, "Trade Ambassadors" flew 400,000 miles to expand trade during 1952.

National exhibition devoted to the many aspects of the British glass industry is being arranged to take place at the New Horticultural Hall, Westminster, from May 11 to 16.

Long service awards were presented to employees of the M.E.M. over Christmas and New Year. Nineteen members of the staff received gold watches after 10 years service, and eight were given illuminated certificates plus an extra week's holiday annually after 21 years.

Diamond H Switches, Ltd., held their annual children's party last Saturday. The company's annual Christmas party took place just before Christmas.

British Welding Research Association is organising its third Summer School of Welding at Ashorne Hill, near Leamington Spa, between April 27 and May 22.

Criticism of Civil Servants' Privileges

THE practice whereby organisations representing Civil Servants and employees of local authorities obtained facilities for their members to buy goods at cheap rates from shops which could be persuaded to co-operate, was the subject of a letter in *The Times* last Tuesday, written by Mr. L. C. Penwill, director of E.C.A. Mr. Penwill poses the question, "Why should those persons imagine they are entitled to any privilege which does not arise from their immediate employment?" The tendency for those employed by the State to try and obtain privileges which bear no relation to their works seems to indicate a dangerous situation, he wrote. Mr. Penwill deprecates the resuscitation of this pre-war practice and invites comments.

Electric Supply News . . .

Axminster

At the recent Rural Council Meeting concern was expressed at a proposal of the South Western Electricity Board to erect an overhead power line on the crest of Hawkesdown Hill. It was pointed out that Hawkesdown was one of Devon's most beautiful hills and was also of historic significance as the site of one of the Armada inland beacons. It is hoped to arrange a meeting between representatives of the Rural and Parish Councils, the Electricity Board, and the County Planning Authority on the site.

Belfast

An increase of 5·66% in units sold during the year ended March 31 last, is recorded in the annual report of the Belfast Corporation. The total sold amounted to 374·9 million units, and the year's operations resulted in a net profit of £107,501. During the period a further 4,943 consumers were connected, bringing that total up to 126,795. The rate of change-over from d.c. to a.c. was slightly lower than in the previous year, some 3,137 consumers being affected during the period. Work on the scheme for reinforcing the main 33 kV distribution proceeded satisfactorily, and a further scheme of system extensions covering the requirements for the next three to five years has been sanctioned. At the Harbour power station another 30 MW generator is being installed, raising the capacity of that station to 174,750 kW. Considerable progress has also been made at the site of the Victoria power station, for which two 30 MW sets and associated boilers are on order, to be in service for the winter of 1954/5. An extension scheme, providing for the installation of two 60 MW sets, is under consideration.

Crieff

The change-over of Crieff's electricity supply from d.c. to a.c. has been completed. The scheme, effected during the past four years by the North of Scotland Hydro-Electric Board, cost about £40,000.

Eire

The Electric Supply Board reports that during December a daily record output was reached with a total of 4,689,000 units. A weekly output record of 30,210,000 units was achieved. The Erne stations gave an output of 8,958,000 units in one week.

Garnish Island (Ilnacullin), at the entrance to Glengarriff Harbour, Co. Cork, which has recently been supplied with electric current, is the second island off the Irish coast to have come under the Rural Electrification Scheme. It was included in the Castletownbere scheme and is supplied by an overhead line span from the mainland.

Gravesend

The Corporation Works Committee has received the report of Dr. R. Lessing, consulting chemist and chemical engineer, on the conditions under which the B.E.A.'s new Tilbury power station is likely to operate. The report contains recommendations as to the steps the Corporation might take to protect the interests of the town. On the Works Committee's recommendation, the matter was considered by the Health Committee, who suggest that necessary equipment be installed in order to collect information of the degree of pollution of the atmosphere which might be caused by the station. They are also asking that a sulphur extracting plant be installed at the station.

Surrey

A new o.h. double circuit 132 kV grid line, planned by the B.E.A. to run from Three Bridges, Sussex, to Sidlow, Surrey, is to be re-routed because of the proposed extension of Gatwick Airport. The change means an additional 3¼ miles of line. Representatives of the B.E.A. have informed Dorking and Horley Rural District Council that even if the Government do not proceed with the airport extension, the power line is of such importance that it will be constructed as now routed without amendment.

LIGHTING SCHEMES

Amesbury.—The Lighting Committee recommends that the changeover of the whole of Amesbury to sodium discharge lighting should be postponed. Meanwhile existing 100 W street lamps are to be changed to 200 W.

Bradford.—Consent has been received to the borrowing of £5,359 for converting from gas to electricity the street lighting at Little Horton Lane, Shearbridge Road and Great Horton Road (section 1).

Chatteris.—U.D.C. has approved in principle the conversion of street lighting from gas to electricity.

Fleetwood.—A special sub-committee is to review the whole street lighting system in the borough.

Gravesend.—Improvements to street lighting in Parrock Farm estate will cost £2,713.

Llandudno.—A special meeting of the Public Lighting Committee has been called to consider a proposal to change over street lighting from gas to electricity.

Lyme Regis.—T.C. recommended to apply for consent to borrow £4,300 for a revised three-stage street lighting scheme.

Northfleet.—Loan sanction has been received to the borrowing of £3,252 for providing lighting in Coldharbour Road.

Warwick.—A deputation has been unsuccessful in persuading the M.o.T. to allow the town's new street lighting system to be completed in the current financial year.

Company Activities . . .

Andhra Valley Power Supply Co.

A small increase in the net profit is recorded by this undertaking for its year ended June 30 last. The total after taxation, etc., was Rs. 8,45,461.

British Thermostat Co.

The proposals for creating capital and convertting Founder's shares into Ordinary shares, details of which were noted in our December 18 issue, were approved at the meeting last week.

W. T. Henley's Telegraph Work Co.

Resolutions authorising capitalisation of £2,437,000 of the share premium account, an increase in the authorised capital from £2,650,000 to £5,100,000 and raising of the issued Ordinary capital from £2,437,500 to £4,875,000, were approved at the extraordinary meeting held last week. In future the nominal amount of each Stock Unit will be 10/- instead of 5/- as before.

London Electric and General Trust

The directors propose to create a further £50,000 of 4½% debenture stock, redeemable January 1, 1973 the whole of which is being allotted to the Prudential Assurance Co. The existing stock in issue amounts to £200,000.

Perak River Hydro-Electric Power Co., Ltd.

The arrears of dividend on the 5% Cumulative Preference Share capital having been paid, the directors have decided that future dividends should be payable half yearly in equal instalments on January 31 and July 31 in each year, instead of on April 1 and October 1 as heretofore, the next payment being on January 31, 1953, in respect of the half year ended on that date. Eight years Preference dividend arrears, to July 31 last, were paid in November. The last dividend on the Ordinary 6% was for 1940-41.

Scottish Cables (South Africa) Ltd.

The company commenced the current year with excellent order books and production during the interval has been up to expectations, stated Mr. Wm. Fraser, chairman at this meeting in Pietermaritzburg last week. To improve the layout of existing factory plant, extensive alterations, consisting principally of the repositioning of plant and equipment have been carried out. In regard to the successful second year's trading, Mr. Fraser pointed out that notwithstanding the heavy capital expenditure over the last two years (amounting to £114,135), the liquid position of the company since its inception has been considerably strengthened. Owing to the large number of shareholders resident in the U.K., application is being made to the London Stock Exchange to permit of the company's shares being more easily dealt with in the U.K.

Stream-line Filters Ltd.

An increase in profit is recorded for 1951. After providing for depreciation, director's remuneration and taxation the profit figure is £40,572 compared with £37,357 for the previous year. The dividend too is raised by 5% to 20%, and the sum of £10,104 (*nil*) has been placed to reserves. Among the current assets listed, stock and work in progress at £65,915 is over £17,000 higher than for the previous year.

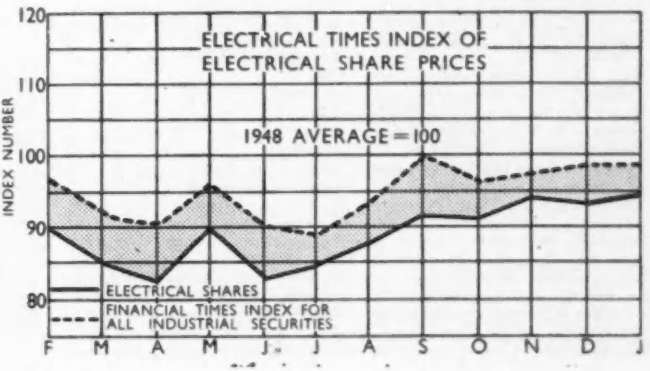
Tata Power Co.

The net profit for the year ended June 30 last, was Rs. 41,53,540, which was about Rs. 4,00,000 lower than for the previous year.

Tata Hydro-Electric Power Supply Co.

This company reports a small increase, at Rs. 5,02,792, in its net profit for the twelve months to June 30 last. The sums of Rs. 92,195 (*Rs. 92,421*) is placed to contingencies, Rs. 37,259 (*Rs. 37,446*) to areas of depreciation, and Rs. 11,22,480 (*Rs. 1C, 42,440*) to dividend reserve.

As might be expected, both share price indices remained steady during December. This was particularly so with regard to the "Financial Times" index for all industrial shares which varied by only 0·1—falling from 98·7 to 98·6. There was a more marked change in the "Electrical Times" index for electrical shares which picked up on its slight fall last month from 93·2 to 94·5. These figures are based on the average prices in 1948



Commercial Information

CONTRACTS OPEN

HOME

Jan. 10.—Dagenham T.C. Applications invited from contractors for names to be placed on list of firms to tender for electrical maintenance work in schools. Borough Engineer and Surveyor, Civic Centre.

Jan. 10.—Peterborough. Lighting and power installations in 116 houses on Dogsthorpe North estate. Applications by above date to F. J. Smith, City Engineer and Surveyor, Town Hall. Deposit £2 2s.

Jan. 12.—Camberwell B.C. Electric lamps included in list of supplies required during year beginning April 1, 1953. Borough Engineer and Surveyor, Town Hall, S.E.5.

Jan. 12.—Dartford T.C. Supply and erection of 97 street lighting units, comprising 80 W mercury lamps, enclosed lanterns and cast-iron columns, for Temple Hill Neighbourhood unit. T. Armstrong, Town Clerk, Dartford. Deposit £2 2s.

Jan. 12.—Leeds. Supply of electric lamps required by Transport Dept. Specifications from General Manager, 1 Swinegate, Leeds.

Jan. 13.—Belfast. Tenders invited for requirements for annual stores, including electrical accessories, insulating material, trolleyhead spares, overhead line equipment, and trolleybus electrical equipment spares. Transport Dept., Sandy Row. Depot, Belfast.

Jan. 13. — Bentley-with-Arksey (Yorks) U.D.C. Electrical installation in 36 houses at Scunthorpe. Surveyor, Council Offices, Cooke St. Deposit £2 2s.

Jan. 13.—West Riding. Renewal of electrical installation at Harrogate fire station. County Architect, Bishopgarth, Westfield Rd., Wakefield.

Jan. 14.—Macclesfield R.D.C. Supply and installation of 34 sodium lighting units and concrete columns in Class B, for Weston Estate, Gawsworth. K. Shatwell, Clerk of Gawsworth Parish Council, Council Offices, King Edward Street, Macclesfield. Deposit £2 2s. Also same for 16 sodium units on concrete columns in Class B for same estate. J. H. Dossett, Borough Engineer, Town Hall, Macclesfield. Deposit £2 2s. (Both advertised Dec. 11.)

Jan. 16.—Belfast. Supply and erection of integrating and summation metering equipment for Victoria power station. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See Dec. 4 issue.)

Jan. 16.—Leicester. Supply and erection of lamps, columns and fittings and laying cables for lighting of Swannington roundabouts. County Engineer and Surveyor, Grey Friars, Leicester. Deposit £5.

Jan. 16.—Londonderry. Electrical installation at Eglington New School. Documents from Education Office, New Row, Coleraine. Deposit £1.

Jan. 16.—Swinton and Pendlebury T.C. Provision and erection of concrete columns, bracket arms and wiring for street lighting in Station Rd. Also supply of lanterns, lamps and auxiliary equipment for same. (Separate contracts.) Borough Engineer and Surveyor, Town Hall, Swinton. Deposit £2.

Jan. 17.—Baildon U.D.C. Electrical work at Birch Close Farm and Weecher Reservoir Cottage, Bingley. Council's water engineer, Town Hall. Also provision of equipment for six 2-point flashing beacons. Council's Surveyor, Town Hall. Separate contracts.

Jan. 17.—Ennerdale (Cumb.) R.D.C. Supply and installation of 35 mercury street lighting units and concrete columns at Egremont. J. Leigh, Engineer and Surveyor, Council Chambers, Cleator.

Jan. 17. — Horbury (Yorks) U.D.C. Installation of electricity in 243 houses and disconnection of lighting points. Surveyor, Town Hall.

Jan. 17.—St. Neots U.D.C. Provision of nine Stanton concrete columns and Wembley lanterns in Avenue Rd. L. Henderson, Clerk of Council, Council Offices. Huntingdon Street.

Jan. 20.—Birkenhead T.C. List of annual supplies required by Ferries Dept., for year ending March 31, 1954, includes electric lamps. Ferries Manager, Woodside.

Jan. 21.—Blackpool T.C. Provision of three illuminated archways in Preston and Poulton New Rds. and South Promenade, by tungsten and cold cathode lighting. Illuminations and Public St. Lighting Officer, Electrical Services Dept., Rigby Rd. East. (See Jan. 1 issue.)

Jan. 21.—Fareham U.D.C. Electrical fittings included in list of materials required for year ending Mar. 31, 1954. Engineer and Surveyor, Westbury Manor.

Jan. 21.—Hertfordshire. Supply of electric lamps required for year ending March 31, 1954. Documents from Central Purchasing Officer, The Old Rectory, Hatfield.

Jan. 21. — Wandsworth B.C. Supply of 219 lanterns and 213 columns, and erection with all operating gear. Borough Engineer, Municipal Buildings, S.W.18. (See Jan. 1 issue.)

Jan. 23.—Edinburgh. Electrical work in (a) Drylaw Mains Housing Development, and (b) Queensferry Rd. flats. City Architect's Office, City Chambers, Edinburgh.

Jan. 23.—Neath T.C. Supply and erection of three concrete columns, lanterns, sodium lamps, cabling, etc., for Stockham's roundabout. D. Bailey, Borough Engineer, Gwyn Hall. Deposit £2 2s. (Advertised in this issue.)

Jan. 24. — Ruislip-Northwood U.D.C. Supplies required during year beginning April 1 next include electric lamps. Engineer and Surveyor, Council Offices, Northwood, Middx.

Jan. 24.—Bootle T.C. Supply of electric lamps and other goods during year beginning April 1. Borough Surveyor, Town Hall.

Jan. 26.—Westminster. Tenders invited for supply of electric lamps, cable, etc., during 12 months beginning April 1. Town Clerk, City Hall, Charing Cross Rd., W.C.2.

Jan. 26.—West Riding. Reinstatement of electrical installation at Castleford Whitwood Mining and Technical College. County Architect, Bishopgarth, Westfield Rd., Wakefield. Deposit £2 2s. (See Jan. 1 issue.)

Jan. 27.—Caithness. Tenders invited for electrical work in 72 houses on various estates—1953 building programme. W. Wilson, County Architect, Wick.

Jan. 27.—Wrexham T.C. Supply of columns, time switches, lanterns and equipment and installation of 102 sodium units and 22 fluorescent units for street lighting on trunk road A483. Borough Engineer and Surveyor, 31 Chester Street. Deposit £2 2s. (See Jan. 1 issue.)

Jan. 28.—Friern Barnet U.D.C. Supply of street lighting lamps (metal filament, sodium and mercury) for year beginning April 1. Engineer and Surveyor, Town Hall, N.11. (Advertised in this issue.)

Jan. 28.—N. Ireland. Lighting, power and bell installation at Downpatrick General Hospital. J. R. W. Murland, Consulting Engineer, 13 Wellington Place, Belfast. Deposit £5 5s.

Jan. 30.—Belfast. Wiring for electric light and power and supply of fittings at Stormont Presbyterian Church. Architects are T. T. Houston and Co., 26 College Gdns., Belfast. Deposit £3 3s.

Jan. 30.—Belfast. City's Electricity Dept. is inviting tenders for various materials, including time switches, distribution transformers, cables, switchgear, lamps, washboilers, kettles, etc. Dept. is at East Bridge St., Belfast. Fee 10s. (Advertised in this issue.)

Jan. 30.—Haltemprice U.D.C. Supply and erection of two submersible vertical spindle "Fullway" centrifugal pumps (375 gal.p.m.) with electric motors, starters, control gear, etc. Engineer and Surveyor, Anlaby House, Anlaby, E. Yorks. Deposit £2.

Jan. 30.—Leeds. Supply, erection and maintenance of two vertical spindle centrifugal borehole pumps (125 gal.p.m.) with electric motors and switchgear. General Manager and Engineer, Waterworks Dept., Civic Hall.

Jan. 31.—Salford. Supply of all kinds of street lighting equipment, including concrete columns, lanterns, lamps, cables etc., required for year beginning April 1. Street Lighting Superintendent, Bloom St., Salford 3.

Jan. 31. — Sevenoaks U.D.C. Re-wiring in screwed conduit throughout swimming and slipper baths. Engineer and Surveyor, Council Offices, Argyle Rd. Deposit £2 2s. (See Jan. 1 issue.)

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

Jan. 29.—South Africa. Various radio equipment—transmitters, receivers, etc.—required by Dept. of Transport, Alexander Bay. Details from Union Tender and Supplies Board, 271 Visagie St., Pretoria. B.o.T. (Ref. CRE 43217/52).*

Feb. 1.—Iraq. Supply of machinery for pumping station in Saklawiya drainage project. Includes four pumping units with complete electrical equipment—electric motors, switchgear, wiring, etc. Secretary General of Development Board of Iraq, Bagdad. B.o.T. (Ref. CRE 40350/52).*

Feb. 3.—S. Rhodesia. Supply of two 2,000 kVA, 11/2·2 kV star/star transformers, and five 150 kVA, 2,200/380 V delta/star transformers, and spares for Umniati B power stations. Secretary, Elect. Supply Commission, P.O. Box 377, Salisbury. B.o.T. (Ref. CRE 43814/52).*

Feb. 4.—Egypt. Supply of total of 35,500 house-service watthour meters and 3,000 watthour meters for industrial use, and 3,000 time switches for Cairo Electricity and Gas Administration. Documents from Chief Inspecting Engineer, Egyptian Government, 41 Tothill St. London S.W.1. Deposit £2 1s (See this issue).

Feb. 12.—Uruguay. Various glass articles notably for lighting purposes required by Administration de Ferrocarriles del Estado, Montevideo. B.o.T. (Ref. CRE 43004/52).*

Feb. 24.—Egypt. Supply and erection of diesel generating station near Qaha, with building work, machinery, including engines, alternators, transformers, switchgear, and all auxiliary work. Specifications issued by Director-General, Mechanical and Electrical Dept., Min. of Public Works, Cairo. B.o.T. (Ref.: CRE 42567/52).*

Mar. 17.—India. Supply and erection of all 400, 11,000 and 66,000 V switchgear, transformers, cables and accessories at Ballarpur power station. Madhya Pradesh Electricity Board, New Castle Bldg., Seminary Hills, Nagpur. Fee Rs.75.

Mar. 25.—Australia. State Electricity Commission of Queensland invites tenders for supply of engine-driven electrical generating plant for Balonne Shire Council. Commission is at Scottish Union House, Eagle St., Brisbane. B.o.T. (Ref. CRE 42494/52).*

Your Queries — Answered

Centrifugal switches for motors, makers of? C.E.—Plessey Co., Ltd., Ilford. Cumbrian Light Eng. and Instrument Co., 24a King St., Maryport, Cumberland. (24739)

"Lenslite" magnifying desk lamp, makers of? M.A.—Electric Depot Ltd., Pritchett St., Birmingham 6. (24746)

Addison Electric Co., Ltd., address of? T.C.—Bosworth Rd., London W.10. (24753)

Flameproof exhaust fan marked B.o.T.-1260, makers of? E.J.—Wilfred Francis, Ltd., Attenbury Lane, Park Rd., Timperley, Ches. (24759)

"Moonstone" lighting fittings, makers of? F.R.—These were supplied originally by firms which are now Metropolitan Vickers Electrical Co., Ltd., 1-3 St. Paul's Churchyard, E.C.4; Underwood (Electric) Ltd., 1 Dickinson St. West, Manchester. (24766)

"Lancastrian" fusegear, makers of? T.E.—Dorman and Smith Ltd., Ordsal Electrical Works, Salford, Manchester. (24772)

"Emmarel" table cookers, suppliers of? I.B.—These were supplied by Emmarel Distributors Ltd., 22 High St., Kingston, a firm which appears to have ceased trading in 1950. (24778)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

"Pen" laundry irons, makers of? T.C. (24786)

CONTRACTS OPEN, Overseas —contd.

Mar. 4.—Australia. Supply of 250 compression dead end assemblies for steel cored aluminium conductor for use on 220 kV, 50 c/s, 3-phase, double circuit, steel tower transmission line. Secretary, State Electricity Commission of Victoria, 22-32 William St. Melbourne. B.o.T. (Ref. CRE 43213/52)*

CONTRACTS PLACED

B.E.A. Condensing and feed heating plants for four 60,000 kW turbo-generator sets at Marchwood, Hick, Hargreaves and Co., Ltd. Additional works auxiliary switchgear at Drakelow, A. Reyrolle and Co. Ltd. 132 kV 2,500 MVA switchgear at Wakefield, A. Reyrolle and Co. Ltd. 132 kV 2,500 MVA switchgear at Skelton Grange, British Thomson-Houston Co. Ltd. Ash handling plant at Clyde's Mill, Babcock and Wilcox Ltd. 132 kV cables at Carrington substation, W. T. Glover and Co., Ltd. 275 kV twin 0·4 sq in. overhead line between Drakelow and Carrington, British Insulated Callender's Construction Co., Ltd., and 275 kV overhead line from Keadby to Ferrybridge, Watsham's, Ltd. Also two 2,000 kW diesel generating sets at Walsall, three 1,330 kW sets at Lister Drive, and one 2,000 kW set at Macclesfield, Mirrless, Bickerton and Day, Ltd. One 1,040 kW diesel generating set at Basingstoke, Ruston and Hornsby, Ltd. One 950 kW set at Clacton and two 950 kW sets at Southend, English Electric Co., Ltd.

Boston R.D.C. Provision of electrically driven pumping machinery at Sutterton Depot, Gwyneres Pumps Ltd., £6,869.

Croydon T.C. Renewal of electrical installation at Thornton Heath fire station, S.E. Electricity Board, £800.

Grimsby T.C. Electrical installation at Chelmsford Ave. secondary school, N. G. Bailey and Co. Ltd., £8,485.

Southport T.C. Conversion and installation of 71 standards to provide improved street lighting, Metropolitan-Vickers Electrical Co., Ltd., £4,426.

Sutherland. Electrical installation at proposed Helmsdale secondary school, Miller and Tait, £1,521.

Woolwich B.C. Electrical installation in flats in Rectory Place, Duncan Watson, Electrical Engineers, Ltd., £1,470.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	285 0 0	—
LEAD, good soft pig (foreign)	100 5 0	£118 0 0
" " "English" quality ...	101 15 0	
TIN (99·99·76%) ... ... (Cash)	945-946	—
" (3 months)	938-938½	—
ALUMINIUM, commercial purity (del.)	166 0 0	—
ZINC	90½-91½	104 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	53 0 0	—
Mild Steel Tape (0·04 in.)	39 15 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

T. E. and J. Hill Ltd. Resolution for voluntary winding-up passed at meeting on Dec. 19. Henry R. Stredder, C.A., 5 St. Philips Place, Birmingham, has been appointed liquidator, to whom creditors should send particulars by Feb. 28.

Stamford Electrical Ltd. Last day for receiving proofs in respect of intended dividends, Jan. 14. Liquidator is M. M. Collins, Official Receiver, Inveresk House, Strand, London, W.C.2.

Wembley Electrical Appliances Ltd. Second dividends of 7s. in £ payable at 27 Old Bond St., London W.1, on Jan. 16.

S. Oliver and Son (Refrigeration) Ltd. Creditors are asked to send particulars to joint liquidator, N. W. Osborne, C.A., 11-12 Finsbury Sq., E.C.2, by Jan. 19.

Cumbrian Electrical Co., Ltd. Meetings of members and creditors will take place at Midland Bank Chambers, Penrith, on Feb. 4, at 2.30 p.m. and 3 p.m. resp. to receive liquidators' report.

Turner Little and Co. Partnership between Albert H. Turner and William C. Little, trading at 63 Lissen St., London N.W.1, dissolved as from March 31. Debts received and paid by W. C. Little, who will continue business under same name.

BANKRUPTCY ACTS

Application for Discharge

Ashton-under-Lyne. Frank Simcox, trading as Simcox Signs at 116 Wellington St., Ashton. Order made on Nov. 28, discharge granted, suspended for one week.

Sheffield. Cyril A. Whittington, electrician trading at 400 Abbeydale Rd. Order made on Nov. 27, discharge suspended for one month.

Appointment of Trustee

Canterbury. John G. Elvidge, electrical contractor trading at 31 Wincheap, Canterbury. Trustee is E. C. Williams, Incorp. Acc., Midland Bank Chambers, High St., Herne Bay.

Companies Winding-up

Altass Electric Co. Ltd. At first meeting of creditors Official Receiver reported that winding-up order made on Nov. 24. Statement of affairs showed unsecured liabilities of £8,301. In addition there were preferential creditors for £1,988 and debentures for £5,561. After these claims had been satisfied, it was estimated that there would be assets amounting to £925 available for the unsecured creditors. Resolution passed for appointment of Mr. N. W. Osborne, C.A., of 11-12 Finsbury Square, E.C.2, as liquidator, with committee of inspection.

First Meeting

Cardiff. Frederick J. Hocken, trading as Auto-Electric Services, at 19 Vere St., Cadoxton, Barry. First meeting at 34 Park Place, Cardiff, on Jan. 13, at 11 a.m., and public exam. at Law Courts, Cathays Park, Cardiff, on Mar. 19 at 11 a.m.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Grundig. 711,610. Class 9. Radio, television, gramophones, radiogramophones, apparatus for reproducing and recording sound, etc. Grundig (G. B.) Ltd., Kidbrooke Park Rd., London S.E.3.

Prestoo. B709,130. Class 9. Electric contractor apparatus, being safety devices for embodiment in electric switches. Alfred Herbert Ltd., Canal Rd., Foleshill, Coventry.

BUSINESS PROSPECTS

HOME

Aveley (Essex). Scheme approved for major shopping centre, comprising some 48 shops with maisonnettes. Total cost is £338,000. It is also proposed to build a £30,000 factory.

Aylesbury T.C. Revised layout approved for 56 houses and flats at Southcourt.

Birmingham. Layout plans approved for Rubery estate providing for 487 dwellings and the Firs estate providing for 1,096 dwellings. Other buildings are also to be built on these sites.

Bradford. Tenders may shortly be invited for rewiring and improvements to electrical installation at Rawson Place Market. Estimated cost, £2,700.

Brighton T.C. Tenders may soon be invited for erection of secondary school on Verndean estate costing £167,300; and for erection of electrical workshop at Preston Technical Institute, also flashing beacon lights for 29 crossings to be installed.

Chester-le-Street R.D.C. Proposals submitted for 44 houses and 16 flats at Kibblesworth, and 8 houses, 5 flats and a shop at Bournmoor.

Cumberland. Erection of first stage of College of Further Education at Whitehaven. J. H. Haughan, County Architect.

Darlington. Tenders may be invited shortly for construction of 186 houses on Firth Moor site.

Doncaster R.D.C. Sixty-two houses to be built at Sprotborough.

Dover. London Fancy Box Co. are planning to build a factory in Beaconsfield Road.

Durham. Plans to be prepared for flats and shops on Sunderland Rd. estate.

Eston (Yorks). Restoration work to be carried out on fire-damaged Majestic Cinema for E. J. Hinge's Cinemas, Ltd.

Falkirk T.C. Dean of Guild Court has approved erection of block of three-storey flats on Langlees site.

Felling U.D.C. Loan sanction for £3,378 is sought for installation of electricity in 139 houses on Stoneygate Lane estate. 76 houses are to be built in Fisherwell Rd., Pelaw.

Gateshead T.C. Council has been asked to erect at least 300 houses next year.

Hampshire. Construction of grammar school at Totton, nr. Southampton. County Architect, The Castle, Winchester.

Hebburn-on-Tyne U.D.C. It is planned to build some 260 houses on Monkton Lane estate.

Kettering. Plans provisionally approved for 400 houses on an estate near Warkton Lane.

Larne (Antrim). N. Ireland Housing Trust is to build 200 houses on its No. 2 site.

Lindsey. Erection of infants' school at Thurnscoe, Cleethorpes. A. R. Clark County Architect, County Offices, Lincoln.

Middlesbrough T.C. Further 92 houses to be built on Park End site. Borough Engineer is J. A. Kenyon.

Middlesbrough T.C. Scheme under consideration for renewing electrical installation at Municipal Buildings.

Paisley. Scottish Special Housing Assoc. to build 28 houses on Lintwhite site.

Prudhoe-on-Tyne U.D.C. It is hoped to start work soon on erection of first batch (160) of 660 houses at West Wyham. W. C. Ireland is council's surveyor.

Rushden U.D.C. Erection of 120 houses on Upper Queen St. estate and other sites. Engineer and Surveyor, Council Bldgs.

Skegness U.D.C. Scheme approved for erection of 68 houses in second development of Sundial estate.

Smethwick T.C. Redevelopment of site near Windmill Lane proposed, involving two 10-storey and four 4-storey blocks of flats and maisonnettes consisting of 152 dwellings.

South Shields. Tyne Improvement Commission is to renew electric control equipment of cranes on S.E. Quay at Tyne Dock. Also layout plans prepared for development of Whiteleas area providing for 2,039 houses.

Stevenage. It is proposed to build secondary modern school at West Shephall, £211,270; and infants school at Roebuck, £40,885.

Stockport T.C. Plans in hand for 192 houses in Brinnington Road.

Stockton-on-Tees. Extension proposed to Pegasus Ltd.'s factory.

Stockton-on-Tees T.C. Layout prepared for 106 houses and blocks of three-storey flats (81 flats in all) at Wren's Mill.

Vaynor and Penderyn R.D.C. Erection of 100 houses at Trefechen, also 58 houses on three other sites, R. H. Rose, clerk of council, Council Offices, 25 Victoria St., Merthyr Tydfil. E. J. H. Hughes, Surveyor and Architect, Council Offices, Merthyr Tydfil.

Wallsend (Northumb) T.C. Layout approved of 164 houses on Low Willington Farm estate.

West Riding. Erection of fire station at Meltham, and extensions to fire station at Holmfirth. County Architect, Bishopgarth, Westfield Rd., Wakefield.

Westminster. It is intended to install flashing lights at 103 pedestrian crossings at estimated initial cost of £18,000.

OVERSEAS

Mexico. Herramientas y Maquinaria S.A., Serapio Lendon 82, Mexico, wish to represent U.K. principals for hydro-electric equipment, electric furnaces and iron and steel works equipment.

India. R. Ambalal and Co., Lohar Street, Tavawala Building, Bombay, wish to import electrical appliances and insulating materials, automotive wires and cables, etc.

TRADE NOTES

Change of Address. Drake and Gorham (Contractors), Ltd., Manchester Branch, have transferred their offices from 29 Piccadilly, Manchester 1, to larger premises at 21 Newton Street, Manchester 1.

All departments of Monsanto Chemicals, Ltd., Sales Division, are now at Victoria Station House, Victoria Street, S.W.1. Telephone: Victoria 2255.

The administration and sales organisation of British Moulded Plastics, Ltd., has been transferred from 37 Portman Square, London W.1, to Avenue Works, Walthamstow Avenue, London E.4, to which address all communications should now be sent.

Cyprus Imports. The Cyprus Trade Advisory Board has announced that no import licences will be issued for the first quarter of 1953 for a variety of goods, including electric lamps, domestic electrical appliances and domestic laundry equipment.

MEETINGS TO NOTE

THURSDAY, JAN. 8

I.E.S. (Glasgow Centre).—"Colour as Framework to Industry." Mrs. D. M. Buckland. 39 Elmbank Crescent, 6.30 p.m.

I.E.S. (Manchester Centre).—"Lighting in Food Industry." R. L. C. Tate. N.W. Elect. Board, Town Hall Extension, 6 p.m.

I.E.S. (Nottingham Centre).—Student Members' Viewpoints by J. Eddyshaw, W. Mosedale, N. S. Rutherford and J. R. Wakefield. Elect. Board, Smithy Row, 6 p.m.

I.E.E. (London).—"Nuclear Reactors and Applications" by Sir John Cockcroft, at 4.30 p.m., also papers on "Nuclear Reactor Instrumentation" at 6 p.m. Savoy Place, W.C.2.

INCORP. PLANT ENGRS. (Newcastle Branch).—"Preventative Maintenance." T. G. Robinson. Roadway House, Oxford St., 7.30 p.m.

I.E.E. (N. Scotland sub-centre).—"Economics of l.v. supplies to new Housing Estates." F. G. Copland. Royal Hotel, Dundee, 7 p.m.

INSTN. OF WORKS MANAGERS (Wembley sub-branch).—"Space Heating of Buildings and Conditions of Comfort." Dr. E. H. Mundel, The Plough, Kenton Rd., Kenton, 12.30 p.m.

E.P.E.A. (Merseyside Tech. Group).—"Water Softening," F. W. Dale. Elect. Showrooms, Whitechapel, Liverpool, 7 p.m.

FRIDAY, JAN. 9

I.E.S. (Birmingham Centre).—Annual dinner.

I.E.E. (N. Staffs sub-centre).—"275 kV Developments on British Grid System." D. P. Sayers, J. S. Forrest and F. J. Lane. Oddfellows' Hall, Stafford, 7 p.m.

A.S.E.E. (Crewe Branch).—"Small Transformer Design." C. N. W. Breece. Royal Hotel, Nantwich Rd., 7.30 p.m.

A.S.E.E. (Liverpool Branch).—"Modern Fixing Practice." H. T. Springings. Engineering Soc., 9 The Temple, Dale St., 7.30 p.m.

E.P.E.A. (S. Meter Engrs. Group).—"Latest in Protective Relaying." A. R. van G. Warrington. Caxton Hall, Westminster, 6.30 p.m.

MONDAY, JAN. 12

I.E.S. (Sheffield Centre).—Presidential Address by W. J. Wellwood Ferguson. University, Western Bank. 6.30 p.m.

INCORP. PLANT ENGRS. (Dundee Branch).—"Electricity in Textile Industry." J. D. Campbell. Mathers Hotel, 7.30 p.m.

I.E.E. (N.E. Centre).—"Uses of Earthed Signal Conductors on Transmission Circuits." W. Casson. Neville Hall, Westgate Rd., Newcastle, 6.15 p.m.

LEICESTER ELECTRICAL SOC.—"Sound Film Projectors." H. Turner. Elect. Offices, Charles St., 7 p.m.

A.S.E.E. (Central London Branch).—Discussion on Coronation Lighting. Falks Showrooms, 20 Mount St., W.1, 7 p.m.

A.S.E.E. (N.W. London Branch).—"Industrial X-ray Equipment." F. L. Veale, Prince of Wales Hotel, Kingsbury, 8 p.m.

TUESDAY, JAN. 13

I.E.S. (London).—"Power Station Lighting." P. D. Figgis. 2 Savoy Hill, W.C.2, 6 p.m.

I.E.E. (London Utilisation Section).—Section dinner-dance at Criterion, Piccadilly.

I.E.E. (N.W. Supply Group).—"Performance of Natural-Draught water-cooling Towers." H. Chilton. Engineers Club, Albert Sq., Manchester, 6.15 p.m.

I.E.E. (N. Ireland Centre).—"Technical Colleges and Education for the Electrical Industry." H. L. Haslegrave. Presbyterian Hostel, Howard St., Belfast, 6.45 p.m.

I.E.E. (Rugby sub-centre).—"TV Programme Origination." D. C. Birkinshaw. College of Technology and Arts, 6.30 p.m.

INSTN. OF MECHANICAL ENGRS.—"Life Assessment Methods for Commercial Vehicles." J. H. Alden. Storeys Gate, London, S.W.1, 5.30 p.m.

NEWPORT ELECTRIC CLUB.—"Modern Trend in Steel Works Electrics." A. W. Ellis. Tredegar Arms Hotel, 7 p.m.

A.S.E.E. (Bolton Branch).—"Industrial Switchgear." A. T. Crawford, Balmoral Hotel, Bradshawgate, 7.30 p.m.

WEDNESDAY, JAN. 14

I.E.S. (Huddersfield Group).—"New Application of Fluorescent Lamps, including Stage Lighting." J. W. Strange. Elect. Showroom, Market St., 7.15 p.m.

I.E.E. (London Radio Section).—"Printed and Potted Electronic Circuits. G. W. A. Dummer and D. L. Johnston. Savoy Place, W.C.2, 5.30 p.m.

INCORP. PLANT ENGRS. (E. Midlands Branch).—"Peak Steam demands and Thermal Storage." E. G. Ritchie. Wellbeck Hotel, Nottingham, 7 p.m.

I.E.E. (Merseyside and N. Wales Centre).—Faraday Lecture. "Light from Dark Ages, Evolution of Electricity Supply." A. R. Cooper. Philharmonic Hall, Liverpool, 6.45 p.m.

I.E.E. (N. Lancs Sub-centre).—"Modern Developments in Electric Welding." H. G. Taylor. Elect. Board Offices, North Rd., Lancaster, 7 p.m.

I.E.E. (Oxford).—"Trend of Technical Education." J. H. Brookes. Elect. Offices, 37 George St., 7 p.m.

INSTN. OF LOCO. ENGRS.—"Limitations on Train Performance with Electric Traction." A. S. Robertson. Instn. of Mechanical Engrs., Storeys Gate, S.W.1, 5.30 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N.E. Section).—"Hearing Aids." R. A. Bull. Neville Hall, Westgate Rd. Newcastle, 6 p.m.

A.S.E.E. (Bradford Branch).—"Further Applications of X-rays." Mr. Hudson. Midland Hotel, 7.30 p.m.

THURSDAY, JAN. 15

I.E.S. (Glos. and Cheltenham Centre).—"Electric Organisms and Living Light." J. Ashmore. G.E.C. Ltd., 2 St. Aldgate St., Gloucester, 6.15 p.m.

INCORP. PLANT ENGRS. (Blackburn Branch).—"Induction Generation by Back-Pressure Equipment." Chamber of Commerce, Richmond Terrace, 7.30 p.m.

BRITISH INSTN. OF RADIO ENGRS. (Merseyside Section).—"Design and Application of Quartz Crystals." R. A. Spears. Elect. Showrooms, Whitechapel, Liverpool, 7 p.m.

A.S.E.E. (Kent Branch).—"Estimating for Electrical Contractors." W. H. Brooks. Royal Star Hotel, Maidstone, 8 p.m.

FRIDAY, JAN. 16

A.S.E.E. (S.E. London Branch).—"Supervising Equipment." V. L. Batchelor. S.E. London Tech. College, Lewisham, 8 p.m.

EXHIBITION DIARY

Packaging Exbn. Third show will open at Olympia on Jan. 20. It closes on Jan. 30.

Amusement Trades Exbn. Ninth annual exbn. will take place at Old Royal Horticultural Hall, Westminster, between Jan. 27 and 29.

Hotel and Catering Exbn. opens at City Hall, Deansgate, Manchester, on Feb. 4, continuing until Feb. 14.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 113 Chancery Lane, London W.C.2.

W. E. Alford (Llanelly) Ltd., 47 Station Rd., Llanelly. Plumbers, gas and electrical engineers, etc. Cap.: £3 000. Dirs.: W. J. P. E. Alford and Mrs. A. G. Alford.

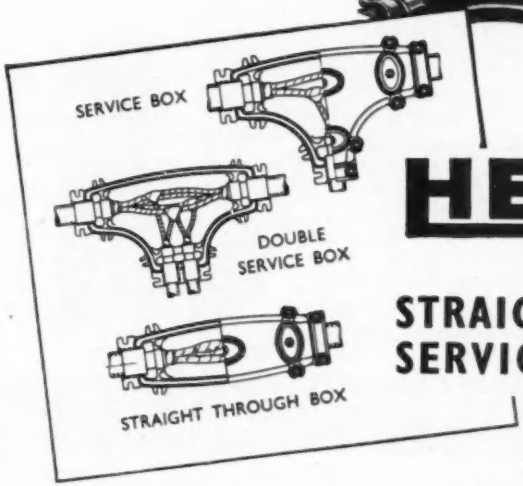
Thomas A. Chapman Ltd., 2 Endsleigh St., W.C.1. Wholesalers, retailers and manufacturers of and dealers in electric lamps and cables, etc. Cap.: £2,000. Dirs.: T. A. Chapman and P. T. Chapman.

F. Coules and Son, Ltd., 6 Dolben St., S.E.1. Constructional, mechanical, electrical, consultant, research and general engineers, etc. Cap.: £100. Dir.: E. H. Butler.

Electrocone Products (Manchester) Ltd., Tower Hill Works, Ellenbrook, Manchester. Manufacturers of an electrical device for heating and applying bituminous and like substances; electrical and mechanical engineers and contractors, etc. Cap.: £100. Dirs.: M. L. Sils and V. Hardern.

The design of HENLEY Cablegrip type Boxes is based on years of experience of practical jointing conditions, and incorporates many features which facilitate jointing operations.
The range includes Straight Through, Service and Branch Boxes for underground installation, each of them incorporating the Cablegrip gland and armour clamp.

Ask for Catalogue 26



HENLEY

CABLEGRIP

STRAIGHT THROUGH SERVICE & BRANCH BOXES

Delivery from stock

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD. 51-53 HATTON GARDEN, LONDON, E.C.1

Quality Control

This test determines the extent to which lamps may possibly be affected, if subjected to adverse conditions of storage and shipment, before being put into service. In the oven shown above they undergo three tests of six hours each with 100% humidity at 70°C, and between each cycle they are cooled to the ambient temperature. This simulates in a few hours the most exacting atmospheric conditions which the lamps may encounter. After this treatment comes the torsion test which consists of twisting the lamps until the adhesion of cap to lamp is broken ; the torque necessary to break this adhesion is registered on the spring scale.

HUMIDITY AND TORSION TEST

This is another example of Quality Control which ensures that the lamps you use are the best that modern manufacturing equipment and methods can make them.

METROVICK LAMPS

Member of the A.E.I. group of companies

METROPOLITAN-VICKERS ELECTRICAL CO. LTD., ST. PAUL'S CORNER, 1-3 ST. PAUL'S CHURCHYARD, LONDON E.C.4

S/A208

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CITY OF BELFAST

Electricity Department

STORES

TENDERS are invited for the supply of the undermentioned materials:—

Form No.

1. Turbine Oil.
3. Firebricks and Fireclay for high temperature furnace requirements.
4. Spare parts for Mechanical Stokers and Ash Conveyors.
5. Carbon Brushes.
8. Glazed Stoneware Ducts and Troughing and Covering Tiles.
9. Feeder, Section and Street Lighting Control Pillars.
13. Time Switches.
15. Distribution Transformers.
18. Electric Washboilers.
19. Electric Kettles.
22. Bare Hard-drawn High conductivity Copper Conductors and P.B.J. Insulated Cables.
24. Transformer Kiosks with h.t. and l.t. Switchgear.
29. Bitite Strip, Prepared Tape and Rubber Tape for Joints, Joint Box Compounds and Refined Bitumen.
30. Lamps.
31. Oilskin Coats, Tarpaulins, Rubber Jointing, etc.
36. Electric Cooker Circuit Accessories.
37. Boiling Plates for Electric Cookers.
40. Labels for Distribution System.

Note: Forms Nos. 30 and 31 are in respect of materials to be supplied to any Department of the Corporation.

Forms of tender may be obtained at the Electricity Department, East Bridge Street, Belfast, on payment of ten shillings (non-returnable) for each form. Extra copies of the forms may be obtained at five shillings each (non-returnable). Cheques should be made payable to the Belfast Corporation Electricity Department. All letters, catalogues, drawings, etc., accompanying tenders must be submitted in duplicate.

Each tender, in sealed envelope marked "Tender for Stores, Electricity Committee," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on Friday, January 30, 1953.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
January 2, 1953. (C 335)

ST. NEOTS URBAN DISTRICT COUNCIL

AVENUE ROAD STREET LIGHTING

TENDERS are invited for the provision of nine Stanton CONCRETE COLUMNS and Wembley LANTERNS in Avenue Road, St. Neots.

Sealed tenders endorsed "Avenue Road Street Lighting" are to be forwarded to the undersigned not later than Saturday, January 17, next.

The Council do not bind themselves to accept the lowest or any tender.

L. HENDERSON,
Clerk of the Council.

Council Offices
Huntingdon Street,
St. Neots, Hunts.
January 1, 1953. (C 299)

URBAN DISTRICT COUNCIL OF SEVENOAKS

SWIMMING AND SLIPPER BATHS

ELECTRICAL INSTALLATION

TENDERS are invited for the DISCONNECTION and REMOVAL of the existing installation and rewiring in screwed conduit throughout the building housing the Swimming and Slipper Baths.

Forms of tender and specification may be obtained from, and the conditions of tender examined at, the office of the Engineer and Surveyor, Council Offices, Argyle Road, Sevenoaks, upon the receipt of two guineas, which sum will be returned upon the receipt of a bona fide tender.

Tenders must be delivered to the undersigned, in the envelope provided, not later than 12 noon on Saturday, January 31, 1953.

The Council do not bind themselves to accept the lowest or any tender.

GEO. T. BRADBURY,
Clerk of the Council.

Council Offices,
Argyle Road,
Sevenoaks, Kent.
December, 1952. (C 219)

BOROUGH OF WREXHAM

TRUNK ROAD GROUP "A" STREET LIGHTING
Wrexham.

TENDERS are invited for the SUPPLY ONLY of Columns, Time-switches, Lanterns and Equipment and/or the INSTALLATION of 102 No. 140 watt Sodium Lighting Units and 22 No. Triple 80-watt Fluorescent Lighting Units on Trunk Road A.483 within the Borough.

Drawings and Conditions of Contract may be inspected at the Office of the Borough Engineer and Surveyor, 31 Chester Street, Wrexham, from whom copies of the Specification and forms of Tender may be obtained on payment of a deposit of two guineas, which will be refunded on receipt of a bona fide Tender.

Tenders in the appropriate plain envelope sealed and endorsed "Trunk Road Lighting" should reach the undersigned not later than noon on Tuesday, January 27, 1953.

The Council do not bind themselves to accept the lowest or any Tender.

PHILIP J. WALTERS,
Town Clerk.

Guildhall, Wrexham.
December 24, 1952. (C 269)

EGYPTIAN GOVERNMENT

TENDERS are called for by the Director-General, Cairo Electricity and Gas Administration for the SUPPLY of 35,500 a.c., single phase, 190/230 V, 50 cycles, 2 wires, house service, WATTHOUR METERS and 3,000 a.c., 3-phase, 380/400 V, 50 cycles, 4 wires, two-rate WATTHOUR METERS for industrial purposes, and 3,000 TIME SWITCHES.

Tenders should be submitted to:—
The Director-General,
Cairo Electricity and Gas Administration,
53 Fouad El Awal Street,
Cairo, Egypt.
not later than noon on February 4, 1953.

Copies of the necessary conditions of tender, specification, etc., can be obtained on application to the Chief Inspecting Engineer, Egyptian Government, 41 Tothill Street, London S.W.1, against remittance of £2 1s. per set, which sum must be prepaid and is not returnable. Copies of these documents are also available for scrutiny at the above address. Cheques must be endorsed permitting transfer to an Egyptian Government account.

Reference No. 55/Elect. & Gas 3/2-438 must be quoted in all correspondence. (C 336)

BOROUGH OF NEATH

TRUNK ROAD A.48
ELECTRIC LIGHTING OF STOCKHAM'S ROUNDABOUT

TENDERS are invited for the SUPPLY and ERECTION of three Concrete Columns, Lanterns and Sodium Lamps at the above roundabout, including all cabling, excavation, etc.

Conditions of Tender and Specification can be obtained from D. Bailey, A.M.I.C.E., Borough Engineer, Gwyn Hall, Neath, on payment of a deposit of £2 2s., which will be refunded on receipt of a bona fide tender not afterwards withdrawn, and the return of all documents.

Tenders, in a sealed envelope bearing no mark which will identify the sender and endorsed "Lighting of Stockham's Roundabout," are to be received by me not later than 12 noon, January 23, 1953.

A. E. I. CURTIS,
Town Clerk.

Town Hall, Neath. (C 268)

FRIERN BARNET URBAN DISTRICT COUNCIL

PUBLIC STREET LIGHTING

TENDERS are invited for the supply of STREET LIGHTING LAMPS for the year commencing April 1, 1953, of the following types:—

(a) Metal filament lamps.
(b) Sodium vapour lamps and jackets.
(c) Mercury vapour lamps.

The conditions of contract, specification and form of tender may be obtained from the Engineer and Surveyor, Town Hall, Friern Barnet, N.11.

Tenders must reach the undersigned not later than 9 a.m. on January 28, 1953.

The Council does not bind itself to accept the lowest or any tender.

B. R. OSTLER,
Clerk of the Council.

Town Hall,
Friern Barnet, N.11. (C 334)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

SOUTH EASTERN GAS BOARD

ELECTRICAL SUPERINTENDENT
Rotherhithe Works.

CANDIDATES who should preferably be Associate Members of the Institution of Electrical Engineers, but should in any case hold qualifications giving exemption from the Graduateship examination, must be familiar with the installation, operation, maintenance and inspection of A.C. Generating Plant, Main Switchgear, Motors, manually operated and automatic Control Gear and Armoured Cables. A knowledge of High Tension Switchgear and Mercury-Arc Rectifiers would be an advantage.

The successful applicant will be responsible to the Station Engineer for electrical maintenance. The Works have been recently reconstructed, including the installation of its own power system, the capacity of which is 300 kW.

Salary within the range £635-£795 p.a.

Applications, giving full particulars of training, qualifications and experience, and quoting reference V19/231, should be sent to the undersigned not later than fourteen days after the publication of this notice.

P. J. McCRAE,
Personnel Manager.

Katharine Street, Croydon. (C 270)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

ENGINEERING DRAUGHTSMAN required at Board Headquarters, Electricity House, Love Lane, Liverpool 3, at a salary within the range £433 to £567 per annum (N.J.B. "D.6").

Applicants should preferably have experience in the general design and layout of indoor and outdoor substations up to 33 kV, cable layout, diagrams of connections, etc., and should have reached the Ordinary National Certificate standard.

The appointment is superannuable and subject to medical examination.

Application forms obtainable from the Establishments Officer at the above address, quoting reference 94A. Closing date January 26, 1953. (C 307)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following vacancies:—

GENERAL ASSISTANT ENGINEER
Technical Department. S/13.373

Applicants should have received a sound technical education and have had experience of technical work in relation to protective gear. Preference will be given to applicants who hold qualifications leading to corporate membership of a senior professional engineering institution.

Salary N.J.B., AX/CX, £501 to £675.

SHIFT CHARGE ENGINEER
Poole Generating Station. S/13.385

Applicants should be in possession of technical qualifications admitting to corporate membership of a recognised professional institution, have had previous experience in a large modern generating station, and preferably have had experience of a modern station with high temperatures and pressures, and pulverised fuel equipment. Those who applied in September, 1952, for a similar vacancy will automatically be reconsidered.

Salary N.J.B., H/7, £772 to £802.

STATION CHEMIST
Earley Generating Station. S/13.374

Applicants should be fully qualified industrial chemists with practical experience of fuel, water and oil testing. A knowledge of boiler chemistry for high steam pressures and temperatures will be an advantage.

Salary N.J.B., G/7, £729 to £758.

Application forms, obtainable from P. D. A. Oliver, Esq., Divisional Secretary, 111 High Street, Portsmouth, should be returned by January 21, 1953. (C 333)

GOVERNMENT OF KUWAIT

DIESEL POWER STATION SHIFT ENGINEER required for service with the Government of Kuwait, Persian Gulf. Applicants should have some technical qualification and should not be more than 35 years of age. He should have good experience in the operation and maintenance of Diesel engines and generators, and also have sufficient electrical knowledge of an a.c. distribution system to be able to operate the power plant in the station efficiently. Steam power plant operation experience would be advantageous as at a later date a steam power station will be operating and it might be possible to transfer the services of the Diesel Power Station Shift Engineers over to the steam station. The starting consolidated salary offered is at the rate of £1,500 per annum, according to experience. Free furnished quarters and free medical attention are provided. The first year will be probationary, and if satisfactory home leave will be granted at the end of three complete years' service. Married accommodation cannot be promised within one year. Applications, stating age and giving full details of experience should, in the first instance, be addressed to the Secretary, Ewbank and Partners Ltd., 10/11 Grosvenor Place, London, S.W.1. (C 247)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following superannuable appointment. National Joint Board salary and conditions.

JUNIOR ENGINEER
Peterborough Generating Station.

Salary Class "F," Grade 15, £390; Grade 14, £466 p.a.

Preference will be given to applicants who have had previous experience in a generating station and who have reached the standard of the Ordinary National Certificate in Electrical Engineering or its equivalent.

Applications giving age and details of qualifications, and experience, should be submitted to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, not later than January 17, 1953.

W. N. C. CLINCH,
Controller
(C 301)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, A THIRD ASSISTANT in the Commercial Department of the Western Sub-Area of the Board at Tenby.

The successful applicant will be required to assist primarily in the planning and detail work of rural development and to assist generally with commercial duties.

Salary in accordance with Class "G," Grade 10 (£608 to £619 to £630) of the N.J.B. Schedule.

Applications, stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by January 21, 1953.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (C 305)

EASTERN ELECTRICITY BOARD

Northmet Sub-Area

APPOINTMENT OF DRAUGHTSMEN—SUB-AREA HEADQUARTERS

(Ref. No. 375)

APPLICATIONS are invited from candidates having the requisite training and experience to fill vacancies for one Senior Draughtsman and four Engineering Draughtsmen on the staff of the Sub-Area Engineer.

The duties include layout of switchgear, transformers and associated equipment for outdoor and indoor type substations up to 33 kV.

The posts are graded under Schedule "D" of the National Joint Board Agreement in Grade 5 for the Senior Draughtsman, £595 to £705 per annum, and Grade 6 for the Engineering Draughtsmen, £458 to £595 per annum, both inclusive of London Allowance.

The commencing salary will be dependent upon qualifications and experience.

Successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications, stating age, education, technical qualifications and experience, with details of present appointment and salary, should be submitted to the Manager, Northmet Sub-Area, Eastern Electricity Board, Northmet House, Southgate, N.14, so as to be received not later than January 26, 1953. (C 306)

LONDON ELECTRICITY BOARD

ENGINEER (OPERATION AND MAINTENANCE)

APPLICATIONS are invited for the above position in the Finsbury/Shoreditch District of the Northern Sub-Area.

Applicants should have had a sound technical education up to at least Higher National Certificate standard, preferably being corporate members of the I.E.E., and possess a practical experience of all branches of engineering work associated with the organisation of a District distribution department, particularly in regard to mains and substation work on both a.c. systems (single and three-phase) and d.c. systems.

The post is graded under Schedule "A" of the National Joint Board Agreement as Class "E," Grade 7, £681 9s. per annum rising to £715 1s. per annum, inclusive of London Allowance.

Application forms, obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed by January 24, 1953. Please enclose addressed envelope and quote ref. V/1565/T on all correspondence. (C 308)

CROWN AGENTS FOR THE COLONIES

STATION ENGINEER, Electricity Department, required for the Gold Coast Local Civil Service for two tours of 18-24 months in the first instance. Commencing salary according to age and experience in the consolidated scale £990 rising to £1,230 a year. Gratuity payable on satisfactory completion of final service at the rate of £25 or £37 10s., according to salary, for each completed period of three months' service. Outfit allowance £80. Free passages. Liberal leave on full salary. Candidates must have served an electrical or mechanical engineering apprenticeship and have had practical experience of the construction and maintenance of overhead line distribution systems for h.t. or l.t. supply and the maintenance of electrical power plant.

Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1 quoting on letter M.29137.B. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (C 300)

GOVERNMENT OF KUWAIT

DIESEL POWER MAINTENANCE ENGINEER required for services with the Government of Kuwait, Persian Gulf. The minimum technical qualification required is the Higher National Certificate in Mechanical Engineering or its equivalent, and age should be from 30 to 35 years. Applicants should have had good experience in Diesel generating stations in an administrative position, and be capable of supervising maintenance and operating the station at the highest possible efficiency. Applicants must have some electrical knowledge, and experience of some steam power plant would be advantageous as at a later date the steam power station is to be commissioned and if suitable a transfer could be arranged. The salary offered is up to £1,650 per annum according to experience. Free furnished quarters and free medical attention are provided. The first year will be probationary, and home leave will be granted at the end of two years' service. Married accommodation cannot be promised during the first year of service. Applications, stating age and giving full details of experience should, in the first instance, be addressed to the Secretary, Ewbank and Partners, Ltd., 10/11 Grosvenor Place, London, S.W.1. (C 248)

BRITISH ELECTRICITY AUTHORITY

South Western Division

DEPUTY STATION SUPERINTENDENT required at Castle Meads Generating Station, Gloucester.

Superannuation scheme. Salary, N.J.B. Class "E," Grade 3, £858 to £894.

The successful applicant will be responsible to the Station Superintendent for the efficient operation and maintenance of the station, and will be required to deputise for him in his absence. Candidates should preferably be Corporate Members of the Institution of Mechanical Engineers, the Institution of Electrical Engineers, or hold equivalent qualifications.

Application forms obtainable from the Divisional Secretary, 26 Oakfield Road, Bristol 8, to be received not later than January 23, 1953. (C 337)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, FIRST ASSISTANT DISTRICT ENGINEER in District 101/2 (Haverfordwest) in the western Sub-Area of the Board.

Applicants should be suitably qualified and have experience in the construction, operation and maintenance of substations and underground and overhead high- and low-voltage mains in urban and rural areas.

Salary in accordance with Class "D," Grade 4 (£746 to £765 to £784) of the N.J.B. Schedule.

Applications, stating age, present position and salary, qualifications and experience, and giving three referees to be addressed to the Secretary to arrive by January 21, 1953.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (C 304)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 97/52.

APPLICATIONS invited for superannuable appointment of ENGINEERING DRAUGHTSMAN (MECHANICAL) in the Generation (Construction) Department. N.J.B. D.6 (£433/£567 p.a.).

Knowledge of mechanical installations and plant layout required and preference given to candidates with H.N.C. or equivalent.

Application forms, obtainable from Div. Secretary, British Electricity Authority, South Wales Division, Cardiff (Pengam Moors) Airport, Cardiff, should be returned by January 20, 1953. (C 273)

CITY OF SALISBURY, SOUTHERN RHODESIA

ELECTRICITY DEPARTMENT

VACANCIES FOR E.H.T. CABLE JOINTERS

APPLICATIONS are invited from Plumber Jointers with experience in all types of cables up to and including 33 kV.

Preference will be given to those Jointers with experience on overhead lines. Present rates of pay commencing at 5s. 9d. per hour, rising to 6s. per hour after 12 months satisfactory service to a maximum of 6s. 2½d. per hour, plus 20% cost-of-living allowance. Children's allowances up to a maximum of three are payable at a rate of £30 per annum for the first child and £24 per annum for each other child.

Applications should be received on or before February 7, 1953, and addressed to the City Electrical Engineer, P.O. Box 73, Salisbury.

A statement of further details can be obtained from the undersigned.

DAVIS AND SOPER, LTD.,
Agents to the City Council of Salisbury.

52-54 St. Mary Axe,
London E.C.3.
December 22, 1952. (C 249)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

SENIOR DRAUGHTSMAN (Architectural) is required in the Chief Generation Engineer's (Construction) Department at Wolverhampton. N.J.B. service conditions, superannuable appointment, salary within Schedule "D," Grade 5, £567 to £671 per annum.

Wide experience in the preparation of working drawings relating to power stations and other buildings required, and the possession of recognised professional qualifications will be an advantage.

Application forms are available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, to be completed and returned by January 31, 1953.

F. W. LAWTON,
Divisional Controller.
(C 303)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following posts in this Division:

THIRD ASSISTANT ENGINEERS (ELECTRICAL)
Divisional H.Q. Vacancy No. 109/52

Applicants should have had a fundamental training in electrical engineering, including workshops, and should preferably have had experience in the manufacture, erection, maintenance and operation of switchgear transformers, electrical auxiliaries, main and multicore cablework, and lighting and heating installations for large power stations. Candidates should possess a university degree or equivalent qualification in electrical engineering.

The salary for the above appointment will be within Schedule "C," Class "AX/DX," Grade 5 (£649 to £858 p.a.) of the National Joint Board Agreement.

Closing date for receipt of applications January 19, 1953.

SECOND ASSISTANT ENGINEER
Generation Operation. Vacancy No. 2/53

Applications are invited from suitably qualified engineers for the above position on the staff of the Generation Engineer (Operation), Southern Group, located at Leicester.

Appropriate technical qualifications to at least Higher National Certificate standard is desirable, and applicants should have served a recognised engineering apprenticeship. Experience subsequent to training must include power station operation and maintenance, preferably in a responsible position.

Salary will be in accordance with N.J.B. Agreement, Schedule "C," Class "AX/DX," Grade 2 (£834 to £1,053 per annum).

Closing date for receipt of applications, January 16, 1953.

The positions will be pensionable within the provisions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned.

L. F. JEFFREY,
Divisional Controller.
(C 310)

SOUTHERN ELECTRICITY BOARD

ASSISTANT ENGINEER (MAINTENANCE)

OXFORD District of No. 2 (Newbury) Sub-Area. Salary N.J.B., Class "G," Grade 10 (£608 to £630 per annum). N.J.B. conditions of service.

The duties of the post will be to assist with the operation and maintenance of h.v. and l.v. distribution mains and substations working at voltages up to 33,000. To undertake minor construction work and assist with the control of materials stocks. Standby duties will be involved. The qualifications of the post will include a sound technical training and experience of similar work.

The successful candidate will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme.

Applications on forms obtainable from the Sub-Area Secretary, 7 Oxford Road, Newbury, Berks, and returned to him in envelopes suitably endorsed not later than January 19, 1953. (C 311)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, an ASSISTANT ENGINEER (SUB-STATIONS) in District 347 (Cardiff) in the Central Sub-Area of the Board.

Candidates should have experience of Construction and Maintenance work in all types of A.C. Substations up to 33 kV and should preferably also have experience in the operation and maintenance of rotary conversion plant.

Salary in accordance with Class G, Grade 10 (£608 £619/£630) of the N.J.B. Schedule.

Applications, stating age, present position and salary, qualifications and experience, and giving three referees to be addressed to the Secretary to arrive by January 17, 1953.

D. G. DODDS,
Secretary.
St. Mellons, Cardiff. (C 272)

MIDLANDS ELECTRICITY BOARD

JUNIOR ENGINEER required in the Wellington District of the Shropshire and Herefordshire Sub-Area. Technical qualifications desirable. Salary £390 per annum (N.J.B. Class E, Grade 15), superannuable.

Apply within 14 days, stating experience in erection of h.v. and l.v. lines and cable laying, age and present position, to Mr. W. Winwood, Manager, Shropshire and Herefordshire Sub-Area, Midlands Electricity Board, Spring Gardens, Shrewsbury.

A. STEPHENS,
Secretary.
(C 271)

YORKSHIRE ELECTRICITY BOARD

No. 5 (Wakefield) Sub-Area

APPLICATIONS are invited for the following appointment:

GENERAL ASSISTANT DISTRICT ENGINEER
Barnsley District

Applicants should preferably be Graduate Members of the Institution of Electrical Engineers and have experience in the construction, operation and maintenance of overhead and underground distribution systems.

Candidates should be prepared to reside in the district and undertake standby duties.

Salary, N.J.B., Class "F," Grade 11, £548 to £565 per annum.

Applications, giving full details of age, qualifications, and experience, should be forwarded to the Manager No 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a Denby Dale Road, Wakefield, not later than January 22, 1953. (C 302)

BRITISH ELECTRICITY AUTHORITY

London Division

INVESTIGATIONAL CHEMIST

APPLICATIONS are invited from qualified chemists interested in analysis and investigational work of a development nature, involving some field work. Candidates must possess a recognised university and/or professional qualification. The laboratory is temporarily at Deptford. Salary and conditions of employment in accordance with N.J.B. Agreement, Schedule "C," Grade 5, Class "AX/EX," £681 9s. to £927 3s. p.a. The starting point on the scale according to age, qualifications and experience. The post is superannuable.

Applications must be made on the form obtainable from Divisional Secretary, B.E.A. London Division, Generation House, Great Portland Street, W.1, and be returned within 14 days of this advertisement. (C 309)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

PLANNING ENGINEER, experienced in design, construction and operation of h.t. and l.t. transmission and distribution networks including substations and switchgear, required at Fife Sub-Area Headquarters, Dunfermline. Salary N.J.B. Class "G," Grade 4, £905 to £944 p.a.

Candidates should be corporate members I.E.E. or possess equivalent qualifications. Applications, stating age, technical qualifications, experience and present grade, with copy references to Manager, Fife Sub-Area, South East Scotland Electricity Board, East Port, Dunfermline, Fife, before January 31, 1953. (C 224)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 1/53

APPLICATIONS invited for superannuable N.J.B. appointment of SECTION ENGINEER in the Transmission Department of this Division, to be based at Uskmouth, nr. Newport. Salary, "AX/CX," Grade 4 (£763 to £949 p.a.).

Applicants should possess H.N.C. (Electrical) or equivalent, have had considerable experience in the administration of a Transmission Section and in the operation and maintenance of 132 kV lines and substations.

Application forms, obtainable from Divisional Secretary, British Electricity Authority, South Wales Division, Cardiff (Pengam Moors) Airport, should be returned by January 24, 1953. After January 17 address will be British Electricity House, Twyn-y-Fedwen Road, Gabalfa, Cardiff.

January 1, 1953. (C 342)

A. REYROLLE & CO., LTD., have vacancies for CONTRACTS ENGINEERS at Hebburn for both home and export work with opportunities for appointment overseas. The work combines technical and commercial activities on switchgear for all voltages and offers considerable scope.—Applicants should write, giving details of their technical qualifications and experience, together with the salary required, to the Contracts Manager, A. Reyrolle & Co., Ltd., Hebburn, Co. Durham. (C 275)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

AN ELECTRICAL ENGINEERING GRADUATE is required for development work in an Industrial Research Organisation. Some post-graduate research experience is desirable. A knowledge of electronic techniques will be advantageous. Salary will be according to qualifications and experience.—Applications should be made to the Director of Research, G.K.N. Group Research Laboratory, Birmingham New Road, Lanesfield, Wolverhampton. (C 274)

BRITISH ELECTRICITY AUTHORITY, Merseyside and North Wales Division, require a MAINTENANCE ENGINEER for the Marchwiel and Wrexham Power Stations. Salary £665 to £688 per annum, N.J.B. Class "D," Grade 6. Superannuable and subject to medical examination.

Applicants must have wide experience in mechanical maintenance of generating plant. Possession of a Higher National Certificate (Mechanical) or equivalent qualification would be an advantage.

Application forms from the Divisional Secretary, Beaconsfield Road, Woolton, Liverpool. Closing date January 16, 1953. (C 323)

BRITISH ELECTRICITY AUTHORITY, Operational Research Section, Generation Operation Branch, Headquarters, Bankside, require:—

(A) SECOND ASSISTANT ENGINEER with a University Degree or equivalent and membership of the I.E.E. or I.Mech.E., together with some years practical experience of Power Stations, preferably including maintenance work. Salary N.J.B. Grade 3, £840/£1,209 inclusive.

(B) ASSISTANT with a University degree preferably in economics or mathematics and experience in Operational Research or similar work. Engineering experience (preferably Electricity Supply) an advantage. Salary N.J.C. Grade 6, £735/£814 or, for a qualified engineer, N.J.B. Grade 4, £753/£981 inclusive.

Applications, stating age, qualifications, experience and present salary to D. Moffat, Director of Establishments, British Electricity House, Winsley Street, London, W.1, to be returned by January 26, 1953. Quote reference AE.302. (C 277)

BRITISH STANDARDS INSTITUTION requires a young ELECTRICAL ENGINEER for work in connection with the approval of all types of electrical equipment for export to Canada. Applicants should have served an apprenticeship and have H.N.C. as a minimum qualification. The position is pensionable and salary will be about £800 in accordance with qualifications and experience.—Apply Establishments Officer, B.S.I., 24 Victoria Street, S.W.1. (C 317)

CAMEROONS DEVELOPMENT CORPORATION require for service in British Cameroons (Nigeria), an ASSISTANT ELECTRICAL ENGINEER. Candidates should be capable of installing, operating and maintaining power plants as well as local distribution street lighting and house wiring. A knowledge of line and radio telephones is desirable. Qualifications not less than A.M.I.E.E., and it is essential that candidates should have both practical experience and ability to teach native labour. Age limits 25 to 35, although an older man might be considered for the appointment. Commencing salary according to ability and experience in scale £775 to £1,175. Tours 18-24 months with generous leave on full pay. Outfit allowance £80. Provident Fund contributions 10 per cent. employee, 15 per cent. Corporation. First-class passages are provided, together with free quarters equipped with heavy furniture.

Applications in writing, giving full particulars, to Rubber & Mining Agencies, Ltd., 52 Leadenhall Street, London, E.C.3. Only applications from candidates selected for further consideration will be acknowledged. This post is exempt from the requirements of The Notification of Vacancies Order, 1952. (C 278)

COMMISSIONS AGENTS wanted. Trade connections and car essential. All areas excepting Midlands, Yorkshire and Lancashire.—"AB" Electrical Fittings, Ltd., 115 Stratford Road, Birmingham 11. (C 279)

CONSULTANTS require shortly ELECTRICAL ENGINEER/DESIGNER for Birmingham Office. Applicants must possess good technical qualifications, preferably Grad.I.E.E. Drawing office experience and detailing essential. Duties include complete design lighting and power installations, h.v. and l.v. mains, Substation design, Public Buildings, Factories, Hospitals, etc., preparation detailed specifications and reports. Applications in own handwriting. Salary according to qualifications.—Box No. 2289, Electrical Times. (C 280)

DEVELOPMENT DESIGN DRAUGHTSMEN required for a small group engaged upon general engineering developments, including special purpose automatic and semi-automatic machinery, metallurgical and chemical engineering processes and plant, combustion and electric furnaces, electrical power control and measuring equipment. Applicants must be engineers with professional or academic qualifications and workshop apprenticeship, and preferably over 28 years of age. These vacancies are only for men with high ability and several years' experience of original design, and capable of supporting a programme of rapid capital expansion and long-term development. Candidates should be able to produce recent references and sample designs if necessary.—Apply: Personnel Manager, Garringtons Ltd., Bromsgrove, Worcs. (C 295)

ELECTRICAL DRAUGHTSMAN required by firm of consulting engineers for work on lighting and power layout drawings. Age 20 to 25.—Write, stating qualifications, experience and salary required, to J. Roger Preston and Partners, 15 North Audley Street, London W.1. (C 313)

ELECTRICAL DRAUGHTSMAN required for interesting development work in Engineering Services Development Division. Applicants should be under 28 years of age and have experience of industrial electrical power and lighting layout and design. Pension scheme. —Write, stating experience and salary required, to Personnel Manager, Ferodo Ltd., Chapel-en-le-Frith, via Stockport, Cheshire. (C 318)

ELECTRICAL ENGINEER for testing and inspecting installations in departmental stores, factories, etc. Able to prepare reports, specifications and drawings for repairs and supervise contractors. Pay £550 to £650 per annum.—Write, stating age and full particulars of experience, to Box ET 946, LPE, 110 St. Martin's Lane, London, W.C.2. (C 281)

ELECTRICIANS required in the Scunthorpe and Gainsborough Districts of the Yorkshire Electricity Board with experience of domestic, commercial and industrial installations. N.J.I.C. rates of pay and conditions of service, the present rate being 3s. 6½d. per hour for a 44-hour, 5-day week.—Applications, giving full details of age, training, experience and indicating the District preferred, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby. (C 315)

ENGINEERS' GUILD LTD. Applications are invited for the post of ASSISTANT SECRETARY to the Engineers' Guild. Previous experience in the secretariat of a professional protective association will be an advantage, and applicants should preferably be chartered civil, mechanical or electrical engineers. The commencing salary will be fixed within the range £900 to £1,100 according to qualifications and experience. The successful applicant will be responsible for the conduct of the business of the Guild under the general direction of the Honorary Secretary. The objects of the Guild are to promote the unity, public usefulness, honour and interests of the engineering profession.—Applications should contain full particulars of qualifications and experience and should be delivered not later than January 20, 1953, to the Honorary Secretary, Engineers' Guild Ltd., 78 Buckingham Gate, London S.W.1. (C 316)

FUSEGEAR TECHNICAL REPRESENTATIVES. Immediate openings are available with the English Electric Co., Ltd. Applicants must have a Higher National Certificate (Electrical) and practical engineering experience or training.—Please write, giving full details and quoting Ref. 1073, to Central Personnel Services, English Electric Co., Ltd., 336-7 Strand, London W.C.2. (C 314)

GENERAL ASSISTANT ENGINEER (SCIENTIST) with a University Degree and Corporate Membership of the Institution of Chemical Engineers or the Royal Institute of Chemistry, to work on boiler combustion problems as junior assistant to the Scientific Adviser, Generation Operation Branch, Headquarters office, British Electricity Authority. Experience of power station practice will be an advantage but is not essential. The successful candidate will acquire experience of power station boiler practice, particularly with relation to the coals burned, and also the microscopy of external boiler deposits.

Salary: N.J.B., Grade 5, £558 to £698, according to qualifications and experience, rising to a maximum of £769, including London allowance.—Forms from D. Moffat, Director of Establishments, British Electricity House, Winsley Street, London W.1, to be returned by January 26, 1953. Quote Ref. AE.305. (C 297)

HORACE GREEN & CO., LTD., Electric Motor Makers, Cononley, Keighley. ASSISTANT required with knowledge of motor design, a.c. and d.c. Experience in estimating and draughtsmanship an advantage.—Apply in writing, giving qualifications, age, experience and salary required. (C 292)

Applications are invited for the appointment of

Chief Technical Engineer

by a prominent firm in the Midlands, manufacturing low tension switchgear and allied electrical installation products.

Applicants, who should be between the age of 30 and 45, preferably University graduates of Ph.D. standing, must have previous technical design and manufacturing experience in this field.

Reply to:—

Box No. 2283, Electrical Times

(C 267p)

IMPORTANT electrical installation contractors with branches throughout the country, have vacancy for capable and energetic contracts planning and supervising ENGINEER, having sound comprehensive contracting experience. Also vacancies for ambitious young CONTRACTING ENGINEERS for general supervision. Our own staff have been notified of this advertisement.—Apply, giving full details of experience to Box No. 2287, Electrical Times. (C 257)

JOHNSON AND PHILLIPS, LTD., have vacancies for SALES ENGINEERS in London, Glasgow and South Wales, and would like to receive applications from experienced and qualified men who are used to dealing with the sales of any or all of the following products: Cables of all types, Switchgear, Transformers, Power Factor Correction Capacitors. For these vacancies preference will be given to men who have had a few years' outside sales experience and are in the 30/35 age group. Applications, with full particulars as to experience, technical background and salary classification, should be sent to the Employment and Welfare Manager, Johnson and Phillips, Ltd., Victoria Way, Charlton, London S.E.7. (C 199)

JOHNSON & PHILLIPS require a DRAUGHTSMAN for their Capacitor Department. Preference will be given to applicants having experience in capacitor work. —Applicants should be between the age of 22 and 26, and should state age, training, experience and salary required in writing to Employment & Welfare Manager, Johnson & Phillips, Ltd., Victoria Works, Charlton, S.E.7. (C 283)

MAINTENANCE ELECTRICIAN required for engineering works. Candidates to have had experience on the following equipment: a.c. and d.c. machinery, electrical equipment on modern machine tools, and a knowledge of industrial electronics.—Apply Box No. AC7791, Samson Clarks, 57/61 Mortimer Street, London W.1. (C 233)

OLD-ESTABLISHED electric lamp manufacturer requires SALES AGENTS, well connected in the electrical industry, for Tyneside and North Eastern England, also Plymouth and South West England.—Apply with full details to Box No. 2303, Electrical Times. (C 338)

RESEARCH. A. Reyrolle and Co., Ltd., have vacancies for ELECTRICAL ENGINEERS and PHYSICISTS to be engaged on the various aspects of research in connection with the development and performance of h.v. and e.h.v. switchgear, including circuit breaking, insulation, system conditions protection and instrumentation. Applicants should be graduates of a British University, preferably with an honours degree, and while previous experience on similar type of work would be an advantage, graduates with the required technical knowledge only may be selected for training. Salaries according to age and experience. Excellent working conditions with modern, fully equipped laboratories; superannuation scheme.—Applications, which will be treated in the strictest confidence, to be submitted with full particulars to the Chief Engineer, A. Reyrolle and Co., Ltd., Hebburn, Co. Durham. (C 234)

SALESWOMEN/DEMONSTRATORS required by prominent manufacturers of domestic appliances to be based in Scotland and the Midlands. Considerable experience with cookers, refrigerators and washing machines essential, together with good domestic science background.—Please reply, quoting Reference AJBG, to Box No. 2293, Electrical Times. (C 292)

SENIOR ENGINEER ASSISTANT required for London office of consulting engineers handling design and installation of privately owned industrial power generating stations, and associated work in connection with power and steam distribution, etc.—Write, giving age, experience, technical qualifications and salary required, to Box E.T.826, c/o 191 Gresham House, E.C.2. (C 298)

STATION ENGINEERS (sev.) required by Air Ministry for installation, operation and maintenance of high and medium voltage electrical distribution systems, electrical installations, steam and hot water heating systems and miscellaneous plant, tools and equipment on R.A.F. stations and Civil Aviation Stations in U.K. Appointments include liability for service overseas. Minimum qualifications and experience (a) Ordinary National Certificate in Electrical Engineering or equivalent standard of technical education; (b) recognised apprenticeship in electrical engineering; (c) employed for at least three years in electrical engineering, preferably on operation and maintenance of mine, factory or workshop plant and services; any experience on maintenance and operation of diesel generating plant and staff supervision advantageous. Commencing salary according to age (normally £550 at 28 or over), qualification and experience, in range £506 to £628, London. Provincial rates somewhat lower. Special allowance payable in addition during overseas service. Appointments non-pensionable. Only naturalborn British subjects.—Write, giving age, full details of qualifications and experience to London Appointments Office, 1-6 Tavistock Square, W.C.1. Reference KI.37, by January 30, 1953. Only candidates selected for interview will be notified. In no circumstances should original testimonials be forwarded. (C 312)

TECHNICAL ASSISTANTS. Several vacancies exist for newly graduated electrical and mechanical engineers to undertake interesting development work in a company with a large programme of capital expansion and long-term development. These posts offer considerable scope covering several branches of interesting technology, and for the gaining of a wide industrial experience. Commencing salaries will be paid according to experience and ability.—Apply: Personnel Manager, Garringtons Ltd., Bromsgrove, Worcs. (C 296)

TELEPHONE MANUFACTURING CO., LTD., wish to appoint a SALES MANAGER to take charge of the sale of their products other than telecommunication line transmission equipment and capacitors. Applicants must have had an engineering training and have spent some years on the sales side in touch with telephone administrations and users of telephone equipment.—Applications, giving details of qualifications, experience and salary required, to Sales Director, Hollingsworth Works, Martell Road, London S.E.21. (C 343)

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INDEX TO ADVERTISERS

Allnutt, Thos , & Co. 80
Angel Truck Co., Ltd. 38
Arrow Electric Switches, Ltd. ... 40
Association of Steel Conduit Manufacturers 14
Attwater & Sons 65
Axon Motor Re-winding Co., Ltd. 74

Belling & Co., Ltd. 6
Belmos Co., Ltd. 33
Berry's Electric, Ltd. 20
Bill Switchgear, Ltd. 5
Birmingham Aluminium Casting (1903) Co., Ltd. 49
British Electric Lamps, Ltd. ... 70
British Electric Resistance Co., Ltd. 24
British Insulated Callender's Cables, Ltd. 1
British National Electrics Ltd. ... 43
British Thomson-Houston Co., Ltd. 22
Britmac Electrical Co., Ltd. ... 31

Carter, B. & F. & Co., Ltd. ... 82
Carter & Co. (Nelson) Ltd. ... 76
Chloride Batteries, Ltd. ... 9
Cole, E.K. Ltd. 74
Connollys (Blackley) Ltd. ... 8
Cressall Manufacturing Co., Ltd. 4
Crompton Parkinson, Ltd. ... 19

Deco Engineering Co., Ltd. ... 78
Dorman & Smith, Ltd. ... 16, 86
Drake & Gorham Wholesale, Ltd. 78

Edison Swan Electric Co., Ltd.... 81
Ekco-Ensign Electric Ltd. ... 23
Electric Construction Co., Ltd.... 26
Electrical Instruments Co. (Hillington), Ltd. 74
Engineering & Lighting Eqpt. Co., Ltd. 13
English Electric Co., Ltd. ... 51
Everett Edgcumbe, Ltd. ... 73

Ferranti, Ltd. 34
Fibreglass, Ltd. 15
Fry's Metal Foundries, Ltd. ... 52

Geipel, Wm., Ltd. 82
General Electric Co., Ltd. 17, 39, 71
Genristo, Ltd. 76
Gilflex Conduits, Ltd. 86
Glover, W. T., & Co., Ltd. ... 85

Hackbridge & Hewittic Electric Co., Ltd. 28
Henley's W. T. Telegraph Works, Co., Ltd. 55
Holophane, Ltd. 25
Hoover, Ltd. 54
Horstmann Gear Co., Ltd. ... 80

Igranic Electric Co., Ltd. ... 77
International Combustion, Ltd. 47

Jackson Boilers, Ltd. 30
Johnson & Phillips, Ltd.... ... 2

Kelly, John & Son 82
Key Engineering Co., Ltd. ... 80

Laurence, Scott & Electromotors, Ltd. 3
Legg (Industries), Ltd. 12
Lewis Spring Co. 18
Lindley Thompson Transformer and Service Co., Ltd. 41

Martindale Electric Co., Ltd. ... 24
Measurement, Ltd. 67
Mersey Cable Works, Ltd. ... 29
Metropolitan Tool & Products, Ltd. 80
Metropolitan-Vickers Electrical Co., Ltd: 45, 56
Metway Electrical Industries, Ltd. 38
Midland Electric Manufacturing Co., Ltd. 50
M.K. Electric, Ltd. 84

Nettle Accessories, Ltd. ... 75

Pirelli-General Cable Works, Ltd. 32
Premier Cooler & Engineering Co., Ltd. 72

Radiant Signs (London) Ltd. 65
Revo Electric Co., Ltd. ... 36, 37
Rotunda, Ltd. 18

Sanders William & Co. (Wednesbury), Ltd. 78
Scholes, Geo., Ltd. 21
Scott H. J., & Co., Ltd. 72
Siemens Electric Lamps & Supplies, Ltd. 46
Smith W. H., & Son Ltd. ... 4
Spencer Wire Co., Ltd. 38
Sperryn & Co., Ltd. 82
Spiral Tube & Components, Co. Ltd 65
Standard Telephones & Cables, Ltd. 79
Statter J. G., & Co., Ltd.... ... 66
Sterling Cable Co., Ltd. ... 10
Sutcliffe Speakman & Co., Ltd. 12

Thorn Electrical Industries, Ltd. 83
Transformer & Electrical Co., Ltd. 66
Transformers (Watford) Ltd. ... 7
Tucker J. H., & Co., Ltd. ... 69

United Ebonite & Lorival Ltd.... 11
Universal Boilers & Engineering Co., Ltd. 68
U.S. Metallic Packing Co., Ltd.... 4

V. G. Porcelain Co., Ltd. ... 42
Volex, Ltd. 27

Walsall Conduits, Ltd. 44
Ward, Thomas W., Ltd. ... 68
Whiteley, B. S. & W., Ltd. ... 35
Wootton & Co., Ltd. 70

Yorkshire Switchgear & Engineering Co., Ltd. 48

Zenith Electric Co., Ltd. ... 16

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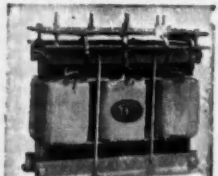

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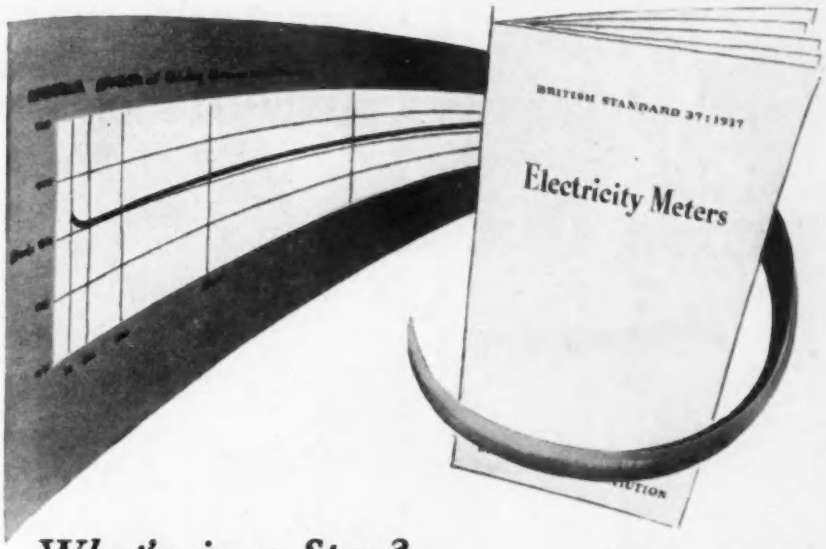

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19/7	1460/920	L.D.C.	Totally Enc.	Slip Ring

NOTE.—The above represents a selected range only. Extensive stocks of both new and reconditioned Motors are carried. Fractional H.P. upwards. Detailed stock list post free on request.

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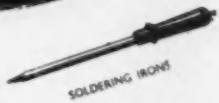
EP/1

New Tucker/SIMMERSTAT

VARIABLE HEAT CONTROL SWITCHED SOCKET



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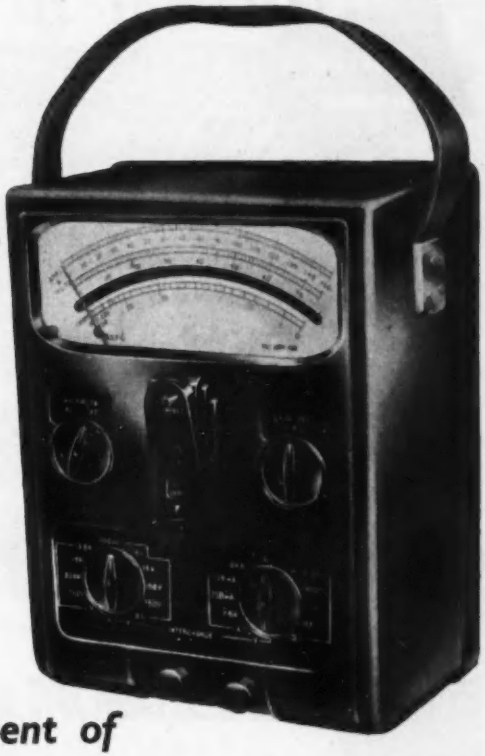

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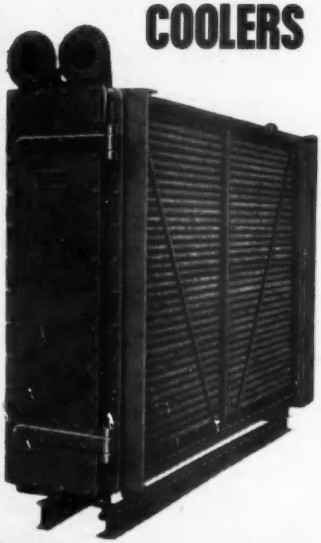

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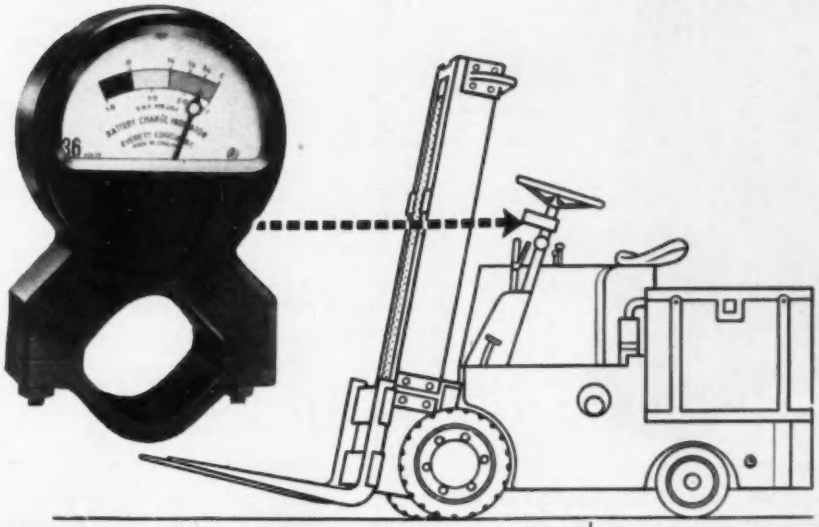

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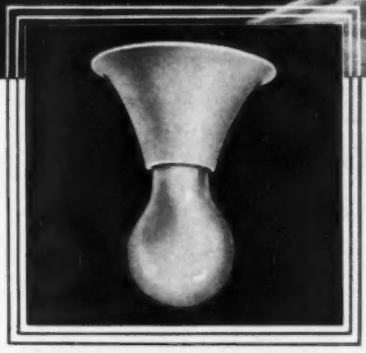

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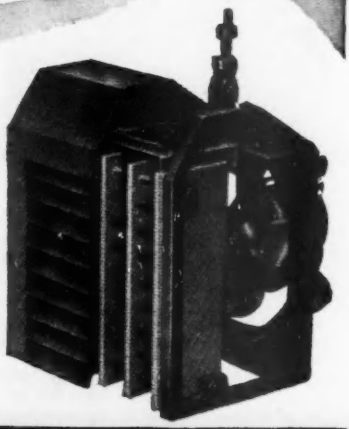

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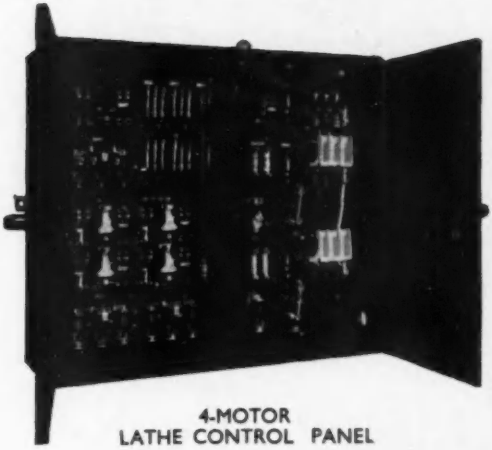

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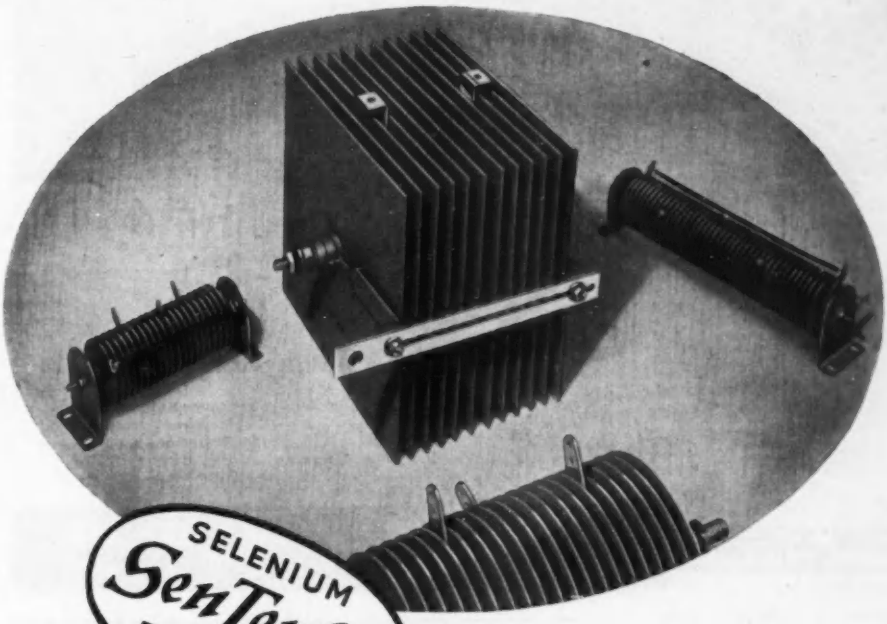

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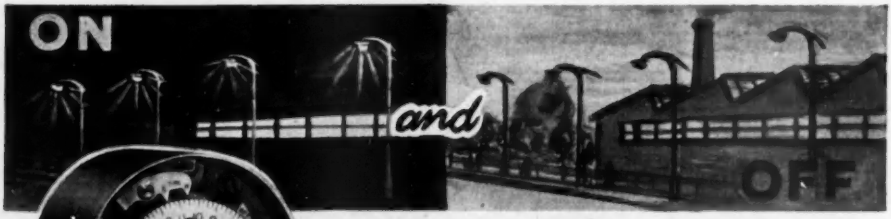

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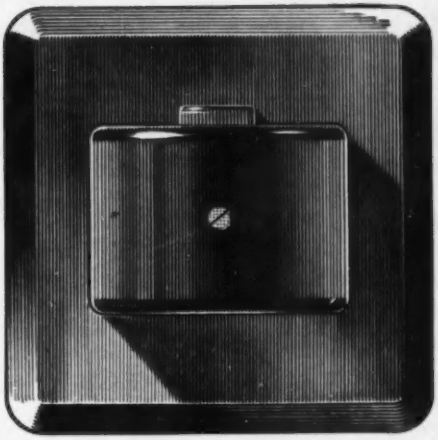

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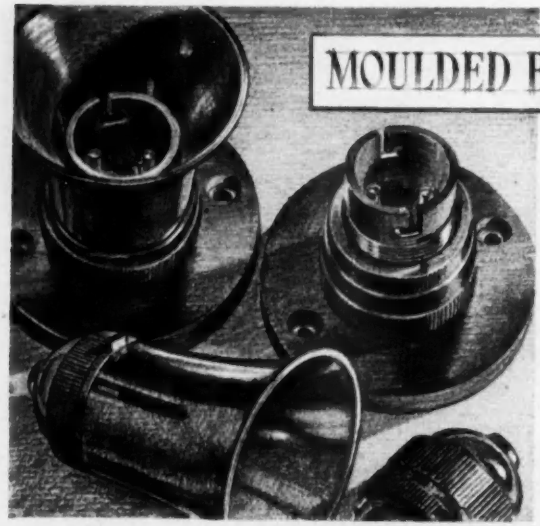

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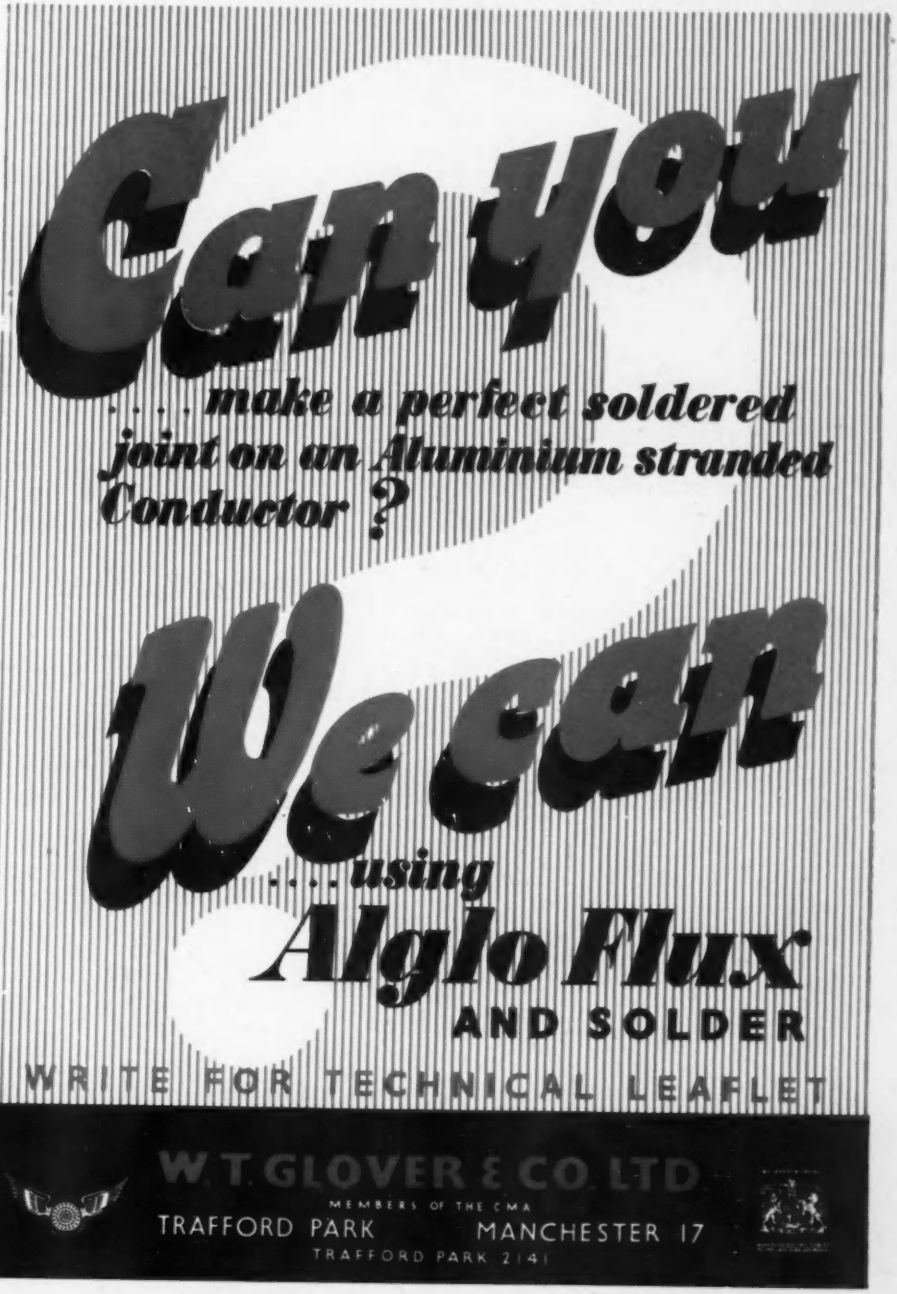
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